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SKILL SET SOUL SEARCH

How do you find the right talent for your business? The answer is not in the Yellow Pages. It's in the Web. By Susan Cramm

SOMEONE TO WATCH OVER ME

Face it — it can be very lonely at the top. That's why many CEOs are seeking out executive coaches like Susan Cramm to serve as mentor, sounding board and friend. Page 52.



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DECEMBER 4, 2000

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- 87 A RUTHLESSLY HONEST** personal skills assessment can be essential for career development, say experts.

ONLINE



In the **E-Commerce Community**, West Coast Bureau Chief **Pimm Fox** offers his take on Marchand's recent troubles. The once shining Internet consulting firm has had to shed some of its clients and otherwise retrain. www.computerworld.com/e-commerce

After reading the **Skills Survey** on page 54, weigh in on what you think are today's hottest skills — and the ones you're having the toughest time trying to find for your staff. www.computerworld.com/careerforum

Online managing editor **Sharon MacIsaac** turns in another installment of the **E-Commerce Chronicle** — this time finding a site where Internet shopping lives up to its promise of being quick, easy and painless. www.computerworld.com/e-commerce

And don't forget to tell us your favorite — and least-favorite — shopping sites. At www.computerworld.com/shoppingurvey

OPINIONS

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cessfully moving people off the welfare rolls.

- 46 PAUL A. STRASSMANN** compares searching for information through search engines to fishing.
- 98 FRANK HAYES** warns that a recent domain-name flap shows that IT must keep on top of its firm's identity on the Web.

AT DEADLINE

CIA Uncovers Internal Computer Misuse

The CIA last week disclosed that it had fired four employees and disciplined 18 others for taking part in a secret chat room set up inside the intelligence agency's classified computer systems. According to the CIA, the "wild misuses" of its network began in the 1980s as an "unofficial users' group" on the mainframe system the agency was using at the time. As it migrated to new systems, the hidden databases were moved to those machines. CIA officials said the agency "uncovered no [evidence] involving the unauthorized disclosure of classified information" via the secret chat room.

Del Signs Linux Deal

Dell Computer Corp., in Round Rock, Texas, has agreed to invest in Linux software maker Exzel Inc. and to preinstall Exzel's applications on all Dell laptop and desktop PCs equipped with the open-source operating system, Mountain View, Calif.-based Exzel's Linux-based Novell desktop shell will be loaded on Dell's Linux-based machines. That gives users the option of using Novell or the desktop software built into Durham, N.C.-based Red Hat Inc.'s version of Linux.

Short Takes

European justice ministers passed a law that will force companies to abide by the terms of all 15 member states of the EUROPEAN UNION when they go online. . . . San Francisco-based HOTWIRE INC., the Redding, Idaho-based competitor to PRICELINE.COM INC., said TRANS WORLD AIRLINES INC. and HAWAIIAN AIRLINES INC. have joined its on-airline equity agency partners. . . . Decreasing demand has caused Red Hat to quickly drop support for SUN MICROSYSTEMS INC.'s SPARC processors in its latest Red Hat 7 Linux distribution. Red Hat 7 still supports INTEL CORP. chips and Alpha processors from COMPAQ COMPUTER CORP. . . . Compaq and North Hollywood, Calif.-based WALT DISNEY INTERNET GROUP announced a \$300 million agreement under which Compaq will provide servers and PCs to the unit of THE WALT DISNEY CO. and services on its Web sites.

Hotel Chain Moves to Wireless Data Access

Carlson's "showcase" system lets managers access back-office data via handhelds

BY BOB BREWEN

CARLSON HOTELS Worldwide has developed and started to roll out a portable, wireless business information management system that analysts say could become a "showcase" product for the hotel industry.

Scott Heinzenman, CIO at Carlson Hotels — which operates the Radisson Hotels & Resorts Worldwide, Regent International Hotels, and Country Inns & Suites chains — said Mobile Access to Carlson Hospitality-Version 1 (MACH-1) is the first hotel system to let managers use handheld devices to access information from back-office systems.

Those back-office systems, which Carlson upgraded during the past three years at a cost of \$20 million, contain vital information about matters such as yield management and room status. But they have tied managers to their desks because that information can only be accessed from PCs.

Freedom From Their Desks

MACH-1, which Minneapolis-based Carlson developed in-house, "lets managers out from behind their desks and talking to the customers," Heinzenman said. "We're not just pushing out static information. [Real] information in a graphical format that makes it easy [for managers] to spot trends." For example, a room-book viewing screen, lets managers view day-by-day or year-by-year occupancy rates.

Carlson chose a version of the Microsoft Corp. Pocket PC from Compaq Computer Corp. over handheld devices based on Palm Inc.'s operating system. The reason, according to Heinzenman, was that it "offered us much more flexibility for building our own service."

It's easier to develop to [than the Palm]. Carlson plans to deploy about 6,000 Compaq iPaq Pocket PCs during the

next 12 to 18 months, equipping corporate executives as well as general managers and front-line personnel at more than 600 hotels.

The first units that Carlson issued to 75 corporate managers in October use infrared connections to synchronize with back-end systems. That system will be supplanted by industry-standard wireless LANs. Carlson also plans to offer managers the option to send and receive data over cellular telephone networks. Heinzenman said Compaq of-

fers both cellular and 802.11b wireless LAN modem options for its iPaq line.

The wireless LANs will also support remote check-in and checkout for guests, Heinzen-



CARLSON chose Pocket PC devices from Compaq because of their flexibility.

Software Aids Shell in Deregulated Market

Aims include fixing billing glitches

BY MATT HAMILTON

This week, Shell Energy Services Co. in Houston will begin deploying a multimillion-dollar customer information system (CIS) that analysts said could scale into an investment of tens of millions of dollars to support the company's efforts to become a nationwide natural gas and electric retailer to homes and businesses.

As the energy market in the U.S. becomes more deregulated,

the software system from Lodestar Corp. in Peabody, Mass., is expected to help the Shell Oil Co. affiliate forecast gas and electricity demands from wholesalers.

The system should also help Shell better manage its business operations and customer relationships, including its billing activities, which have been problematic, analysts said.

"This kind of software is extremely important in the deregulated markets with many competitors," said analyst Karl Jensen at The Yankee Group in Boston. CIS software, he said, "is the key to the way you drive costs out of entering a deregulated market."

Analysts said Shell Energy picked the Lodestar product in March after experiencing months of glitches in sending bills to more than 300,000 retail natural gas customers in Georgia. In some cases, Shell Energy bills were sent five months late, Jensen said.

Shell isn't alone. Analysts said many energy companies have experienced billing problems since states such as California and Pennsylvania began deregulating their utility markets in the mid- to late 1990s.

The Lodestar system will

man said. But he said he views that as an ancillary function to the delivery of time-critical information to managers.

Alan Reiter, an analyst at Wireless Internet and Mobile Computing in Chevy Chase, Md., said MACH-1 is the first such system he's aware of in the lodging industry.

"I have heard of airlines doing this, but this is a first for hotels," Reiter said. "It shows that at least one hotel chain believes in the value of wireless. This is in a serious stuff. It could become a showcase for hotels, and I would not be surprised if other chains sent out personnel to spy on the system."

Tim Scannell, an analyst at Mobile Insights Inc. in Mountain View, Calif., called Carlson's wireless project a significant development. "Service organizations are a huge area for wireless because they have a field force that needs information pushed to them," he said. ■

Growing Market

Projected spending on energy by homes and businesses:



first be deployed in Georgia and later expanded for use in deregulated gas and electric markets in Pennsylvania, Ohio and Texas, said analysts and officials at the software maker.

Lodestar a Good Fit at Shell

Shell officials declined to comment on the deployment until it has been up and running for three months. However, Shell Energy CIO Tim Byers said in a press release in March that the Lodestar product was chosen over several competitors and made a good fit with Shell's existing software and a customer relationship management system it licenses from Siebel Systems Inc. in San Mateo, Calif.

Shell Energy has the name recognition and clout to be a major player in retail natural gas and electricity sales as deregulation becomes more widespread, said Bill Swanton and Jill Febowitz, analysts at AMR Research Inc. in Boston.

To date, 24 states have deregulated their utility industries. Yet just 2% of residential customers nationwide have switched utility companies, Febowitz said. The rate of switching is "much higher" for businesses, she added. ■

Canada to Use Iris Scans for Customs IDs

Biometric system will check people arriving on international flights

BY MICHAEL MEEHAN

Next year, Canadian citizens will be able to pass through customs in the blink of an eye. Literally.

Canada's eight largest airports plan to install a revamped customs processing system that will use iris scan biometrics to check people arriving on international flights.

The system is being developed by Unisys Corp. in Blue Bell, Pa., and is based on iris scanning technology from Iridian Technologies Inc. in Marlton, N.J. According to Iridian, this is the largest rollout to date of the technology.

"Air travel is increasing, and customs checks are a process that involves a lot of customs inspectors," said Sid Valo, vice president of business and strategic development at the Greater Toronto Airports Authority. "The choice is: Either you keep adding more people or you come up with a secure automated system to do the job." Canada chose to spend \$10 million to roll out the system at the eight airports, according to Valo.

The iris scanning technology uses a picture of the human eye to translate the 266 independent characteristics of the iris into a 512-byte digital code. The scan involves no physical contact, takes only seconds to process and requires a living, pulsing eye.

Fall Kick-Off

Passengers will be able to register into the system at Canada's eight international airports starting next fall, Valo said. They will be issued cards that contain their biometric code on information strips.

When passing through Canadian customs, a registered passenger can proceed directly to a kiosk, swipe his card and have his iris scanned. The scan is instantly matched against a database maintained by the Canadian government, and the passenger answers a few questions on a touch screen.

"You won't have to show a

passport, and the automated process should move much quicker than the current system," Valo said.

The initial program will be limited to Canadians only, but Valo said it could be broadened to include U.S. citizens in coming years. He noted that the airports plan to build commercial uses for the cards as well, including the possibility of airline check-in.

E-Boarding Passes

McLean, Va.-based EyeTicket Corp. debuted such a system at last month's Comdex show in Las Vegas. The system scans a person's iris, prints baggage tags and sends an electronic

The Eyes Have It

• Chances of any two irises sharing the same characteristics: 1 in 30²⁴

• Total human population in the history of Earth: 10¹⁰

boarding pass with gate and flight time information to the passenger's Windows CE handheld device.

"We're looking to have passengers processed with this system in the next six months," said Evan Smith, senior vice president at EyeTicket.

Man Snijder, business development manager for Job, Hochschule Security Solutions BV in Haarlem, Netherlands, says his company, which prints money and passports for Euro-

pean nations, is looking to add iris scan codes to passports.

"We see this biometric [technology] having the proper security for border passing, immigration checks and social security systems," Snijder said.

Richard Hunter, managing vice president of e-metrics at Gartner Group Inc. in Stamford, Conn., said iris scans have the benefit of being exact and noninvasive.

"Yet there's still the possibility someone can intercept that information postcard, much like what happens with credit card fraud," Hunter said. "So it's not bulletproof unless the system is bulletproof."

He added that only time will tell how well humans react to having parts of their bodies transformed into a bar code.

"The world's becoming less private as we gather ever more personal information, and we haven't thought a whole lot of what it means to be in that environment," he said. ■

Discount Travel Firm Seeks To Expand Use of E-Tickets

Cheap Tickets, Sabre develop customized system

BY MICHAEL MEEHAN

Cheap Tickets Inc., a Honolulu-based discount travel company, last week introduced an electronic-ticketing option for trips with multiple legs and carriers.

"The e-tickets are great if you're flying on a single carrier and buying a published fare, but once you get multiple carriers and nonpublished fares, it becomes real tricky," said Ron McElfresh, Cheap Tickets' vice president of online services and product management.

Lack of Standards a Challenge

To add the capability, Cheap Tickets built a customized electronic-ticketing system with its technology partner, Sabre Inc. in Fort Worth, Texas. This was challenging because air carriers have yet to adopt common standards for the tickets, and airlines often

don't offer electronic tickets for special fares, according to McElfresh.

He said Cheap Tickets spent five months designing the new system and expects it to pay for itself after six months. Electronic tickets will let the travel company avoid printing and express-mail costs, in addition to letting the company sell a ticket right up until the day of a flight. Until now, Cheap Tickets was only able to issue tickets for flights that were five or more days away.

A Noteworthy Effort

While other online travel agencies have previously issued electronic tickets, Cheap Tickets' effort to do so across multiple carriers is worth noting, said Henry Harteveldt, a senior analyst at Forrester Research Inc. in Cambridge, Mass.

"The airline industry is showing signs that it understands that it needs to develop some standards in this area," Harteveldt said. "So hopefully, this issue will be resolved soon enough."

The OpenTravel Alliance announced in September that it's close to creating an XML standard for electronic tickets that would make it easier for air carriers and travel suppliers to exchange ticketing information with one another.

Cheap Tickets has sold more than 1 million tickets this year through its four call centers. McElfresh said he expects 30% of the tickets sold next year to be electronic. ■

BRIEFS

CIO Positions Filled

New CIOs were announced last week by Alcoa Inc. in Pittsburgh and GreenPoint Financial Corp. in New York. Rudolph Huber, executive director of finance at Alcoa's Australian unit for the past three years, was named the aluminum maker's new CIO. At GreenPoint, Kevin Stein has been appointed as the housing lender and thrift banking company's first CIO.

Buy.com Takes First Place in Online Sales

Buy.com Inc., the Aliso Viejo, Calif.-based online electronics retailer, surpassed Amazon.com Inc., Best Buy Co., and Egghead.com Inc. for the first time as the most popular online buying destination for consumers, according to the PowerRankings released last week by Forrester Research Inc. in Cambridge, Mass. Forrester conducted online surveys of 20,000 consumers, who identified the most recent e-commerce sites that they purchased from and rated their experiences.

Natural Gas Auction Yields a Bargain

Chicago-based energy industry exchange Enbridge Inc. announced last week that it had completed its first live reverse auctions valued at \$3 million, with an additional \$45 million anticipated within the next two months. The first auction included six natural gas suppliers bidding for business from King of Prussia, Pa.-based UGI Corp., a founding member of the online exchange. UGI said prices in the reverse auction "were substantially below those that would be expected given historical data in the traditional request-for-quote process."

New Intel Router Handles Encryption

Intel Corp. last week announced availability of a broadband router with built-in virtual private networking support. Intel officials said the chip set in the unit handles encryption and decryption normally done by servers, firewalls or individual PCs. The unit sells for \$599.

1996

1998

1999

2000

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Farewell to Paper

In recent years, Cheap Tickets has been busy transforming itself from a brick-and-mortar travel agency into a tech-savvy operation with an edgy-sounding company name and a profitable.

The company is founded and begins selling nonpublished fares through its call centers.

CheapTickets.com Web site debut.

Twenty-five percent of the company's revenue comes from Web sales.

Cheap Tickets builds a customized system to issue electronic tickets to its passengers over multiple legs and numerous carriers.

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E-Business a Rough Road for Most Firms

Some warn peers of risks of Net ventures

BY MARC L. BONDINI

AMELIA ISLAND, FLA.

ALTHOUGH SOME companies are making money from e-business ventures, just as many—or more—are losing it and squandering resources, according to attendees at a conference here last week.

In fact, most companies venturing onto the Web to do business are likely to fail, said Shikhar Ghosh, president of Waltham, Mass.-based Internet portal vendor iBelong Inc., during Boston, Mass.-based The Delphi Group's business-to-business commerce summit.

"Don't start moving in this direction lightly," said keynote speaker Dee Hock, founder and CEO emeritus of Foster City, Calif.-based Visa International Inc. "All this comes with a surgeon general's warning: Be very careful."

Despite Hock's harsh warning, Visa is a high-profile success story. He noted that Visa established the archetypal e-business network for less than \$30,000 and had it running in less than a year, without the help of consultants.

The biggest obstacle, Hock warned the audience, is the mind-set of employees who may be resistant to change.

Illustrating the dangers that lurk on the Web, Kavi Kalakota, chairman of Shoppy.com and an analyst at e-Business Strategies, both in Atlanta, announced at the conference that his 12-month-old business-to-business exchange for companies in the hospital industry had just gone out of business.

Shoppy.com, a \$5 million-plus investment that had 90 employees, managed to sign up 400 hotels to use its online marketplace. But getting an exchange to function profitably is tricky and expensive, Kalakota said.

For example, he noted, Shoppy.com's systems required a large amount of hu-

man intervention on the back end to process customers' invoices and orders. "It got really messy," Kalakota said.

While there are companies that claim to be profiting from their Web ventures, it's difficult to quantify these successes, because different companies use different metrics.

For instance, Millipore Corp.,

a Bedford, Mass.-based manufacturer of purification tools for the biopharmaceutical and microelectronics industries, has yet to see a profit from online catalog transactions, according to Thomas Anderson, the firm's director of corporate communications.

But the Millipore considers establishing its brand name on the Web a profitable investment, Anderson noted. In fact, he added, the company plans to expand its online opera-

tions by interfacing with its suppliers to reduce procurement costs.

What's crucial for e-business success is tying IT initiatives to strategic goals, rather than viewing IT as an end in itself, said Robert Rudzki, vice president of business development at Bethlehem Steel Corp. in Bethlehem, Pa. "Are you measuring progress by press releases or in ways more tied to your bottom line?" he asked.

Some companies demand to know up front from e-business vendors just what they're paying for. "We are seen as a re-

source stream and have to identify where we are bringing in more money than we spend,"

said Evan Crawford, executive director of e-transformation at The Children's Hospital of Philadelphia.

The hospital, which has 6,000 employees and 40 locations, is now launching a multimillion-dollar portal to connect its physicians and patients and help with business-to-business operations, Crawford said. He

said the hospital's Web site has already shown a return on investment by attracting donations and new-patient referrals. ■



EVAN CRAWFORD'S hospital demands that returns justify online expenditures.

Internet Threatening Trade Show Incomes

Trade groups' survival tactics
irk some members

BY JULIA KIM

With up-to-the-minute industry news and information on suppliers, products, services and pricing available anytime, anywhere online, why should anyone get on a plane once or twice a year and fly to Orlando or some other conference mecca for an industry trade show?

This is the 40-or-so question facing thousands of trade associations, as business-to-business electronic marketplaces and other online ventures continue to crowd the Internet in virtually all industries.

At stake for many of the associations is their very survival, since the nonprofit membership groups derive the lion's share of their operating budgets from annual or semi-annual trade shows. Still, as some members see it, associations' survival tactics aren't always fair to their members.

For example, some nonprofits, including the Washington-based Packaging Machinery Manufacturers Institute (PMMI), have launched or co-own for-profit Web sites. Others, like

the International Sanitary Supply Association (ISSA) in Lincolnwood, Ill., have partnered with third-party e-commerce software and service vendors to provide members with individually branded Web sites.

But in both cases, the associations have been known to prohibit competing industry services—some of which are operated by their own members—from participating at their own sponsored events or from advertising in groups' publications.

For example, when JanCentral.com, the online arm of GlobalSupplyNet.com Inc., a New York-based electronic marketplace serving the janitorial products industry, inquired about advertising with the ISSA, it received an e-mail from the association's director of publications that read: "I am sorry, but we are not

accepting advertising or press releases from Internet portals." Last week, however, Rebecca Pando, marketing director at the nonprofit ISSA, said the association has no such policy.

The PMMI excluded virtually all dot-com competitors at its annual trade show earlier this year. The only Internet-based exhibitor was the PMMI's own PackExpo.com.

The exclusion of others

"created quite an uproar in the industry," according to Steve Miller, a trade show consultant in Federal Way, Wash., who works with 15 of the top 20 trade associations in the U.S., including the PMMI.

But PMMI President Chuck Yuskas said he sees extending the trade association's name to PackExpo as a way of "creating a trusted third party" for the industry's buyers and sellers.

"Just like anybody else, trade associations are trying to figure out what the Internet is going to do to them," Miller said. "What the smart associations have been doing is creating an online presence that continues what they do at trade shows on a year-round basis."

Ironically, trade associations have been able to exploit the Internet to increase the number of exhibitors at trade shows—

but not necessarily the number of attendees, according to Dick Berry, director of exhibitions at the Washington-based American Society of Association Executives (ASAE), which has 25,000 individual members representing 11,000 trade groups.

For example, at the ASAE's show this year, 150 more exhibitors were on the show floor than last year, Berry said. The association has been using the Internet to show exhibitors a "virtual show booth" and to sell booth space online.

As trade groups continue to try to find their way, GlobalSupplyNet CEO Steve Odner, for one, said he isn't worried about being excluded from the ISSA's trade show and publications.

"It's a fact that after the trade show, nobody talks to ISSA," Odner said. "We're on the Internet with 24/7 information. We don't view them as competitors, because at the end of the day, they will never be able to compete with us." ■



STEVE ODNER: "After the trade show, nobody talks to ISSA."

Nasdaq Hit by Another Glitch

BY LEE COPELAND

A software glitch in the Nasdaq Stock Market's price quote engine caused the stock exchange to halt trading for 11 minutes last Wednesday.

Officials at Nasdaq Stock Market Inc. in Washington said the halt was caused by a soft-

ware problem in its Small Order Executive System and its SelectNet quote update system.

"It was a unique combination of circumstances that caused the problem, but the problem was fixed by after-hours trading," said Nasdaq spokesman Andy MacMillan.

It's the third time this year that the stock exchange has experienced a slowdown or a halt in trading due to problems with the system. Other problems occurred on Feb. 18 and April 4. ■

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BRIEFS

NTT Unit Takes Stake In AT&T Wireless

In a deal expected to be completed next month, Japan's NTT DoCoMo Inc. is spending more than \$9.8 billion to gain a 16% stake in AT&T Wireless Systems Inc., the third-largest wireless carrier in the U.S. AT&T Wireless is a subsidiary of AT&T Corp., but is slated to be spun off into a separate company next year. DoCoMo also filed a deal last week to take a 20% stake in Taiwan's KID Telecommunications.

Survey: More CEOs Report to CEO

More than half of the CEOs in U.S. firms now report directly to the CEO or president, up from 43% in 1997, according to a survey of 288 CEOs by New York executive search firm John J. Davis & Associates. Another 22% report to the chief operating officer. Half as many CEOs now report to the chief financial officer as did in 1997, the survey showed.

Verizon Backs Out

Verizon Communications Inc. last week terminated a deal under which it planned to merge its Digital Subscriber Line business into struggling NorthPoint Communications Group Inc. and invest \$600 million in that company. The move prompted NorthPoint's CEO to threaten legal action. Verizon said it was dropping the planned merger because of a "deterioration in NorthPoint's business, operations and financial condition" since the deal was signed.

Amazon.com Crashes Twice in One Week

The Web site of online retailer Amazon.com Inc. crashed twice in one week last month, falling victim to what the company has called an internal bug.

The site first crashed on Nov. 24 for about 30 minutes on the busiest day of the year for U.S. shoppers. On Nov. 30, it went down for about 15 minutes. A spokeswoman for the Seattle-based company said the problem wasn't the result of the site's inability to handle increased Web traffic.

Microsoft Slams Judge In Antitrust Case

Vendor wants Jackson disqualified, but judge may oversee breakup if appeal fails

BY PATRICK THIBODEAU
WASHINGTON

MICROSOFT Corp. made a request of the U.S. Court of Appeals last week to reverse the decision that the company violated antitrust law and, failing that, to assure that trial Judge Thomas Penfield Jackson would have nothing more to do with the case.

Microsoft may still have reason to fear Jackson, who could oversee the company's breakup if its appeal fails.

In its 150-page brief, Microsoft said the antitrust trial "was infected with error" and accused the judge of running a "highly unusual and prejudicial" trial and violating judicial codes of conduct by speaking publicly about the case.

Microsoft said it wants Jackson

disqualified from any further proceedings. But Jackson may still shape the final chapter. If Microsoft doesn't win on appeal, he could supervise his plan to separate Microsoft's operating system unit from the rest of its business — or some lesser remedy sought by the appeals court, said legal experts.

If the breakup is imposed, the details will be worked out by the two parties. But Jackson "would become effectively the manager, while [the] parties develop a breakup proposal," said Herb Hovenkamp, a law professor at the University of Iowa in Iowa City and an antitrust expert.

Since the trial ended in June, Jackson has been outspoken about the case, defending his decision while also acknowledging that his rulings may be

"vulnerable on appeal." He has also acknowledged his lack of expertise in forming a remedy. Legal experts said they aren't certain how these comments will affect the appeals court judges.

Judging the Judge

"Jackson's comments create a lens through which the Court of Appeals will look at what he has done," said William Kovacic, a visiting professor of antitrust law at The George Washington University in Washington.

"You want a careful judicial craftsman, exercising cautious, sensible judgments," said Kovacic.

"His comments bespeak a lack of good judgment and an inclination to use very crude rules of thumb in deciding key issues in the case," he added.

But Hovenkamp said he doubts the appeals court will give much weight to Jackson's out-of-court comments. "They are not materially different

The Road Ahead

Jan. 12: Government responds

Jan. 29: Microsoft replies

Feb. 9: Final briefs

Feb. 26-27: Oral arguments

Spring or summer: Decision

from the things that the judge said during the course of the trial," Hovenkamp said.

The U.S. Department of Justice, along with the state governments that joined the agency in the case against Microsoft, will respond Jan. 12.

DOJ spokeswoman Gina Talamona last week said Jackson's judgment "is well supported by the evidence offered during a 78-day trial, including thousands of pages of Microsoft's own documents."

Microsoft, in its brief, said it broke no law.

"Microsoft did not engage in anticompetitive conduct," the company wrote in its appeal. "To the contrary, Microsoft's conduct — improving its platform and broadly distributing those improvements — was procompetitive. It also made perfect business sense."

Vendors Propose XML Security Method

Standard aimed at easier integration

BY TODD WEISS

Microsoft Corp. and VeriSign Inc. last week unveiled an XML-based online security standard aimed at allowing easier integration of digital signatures and encryption for e-commerce.

The protocol, known as the XML Key Management Specification (XKMS), uses the relative simplicity of XML to implement two key aspects of secure e-commerce, according to the companies.

The specification will be submitted to Web standards bodies for consideration as an open Internet standard.

Kama Krishna, an analyst at Ryan, Beck & Co. in Livingston, N.J., said the proposed specification validates the use

of XML as a de facto standard for a wide range of e-commerce applications.

WebMethods Inc., an enterprise application integration firm in Fairfax, Va., joined security company VeriSign and software giant Microsoft in designing XKMS.

RSA Security Inc., an encryption company in Bedford, Mass., said in a statement that it's backing the proposed standard and including it in future software releases.

XKMS aims to simplify application building by moving digital-signature handling and encryption out of the applications themselves.

Instead, complex functions such as digital certificate processing and revocation status checking can be placed on servers and accessed as needed through programmed XML transactions.

XKMS could boost online

security by merging the protections of digital certificates, public-key infrastructure and the graceful nature of the XML Web language, said Pete Lindstrom, a security analyst at Hurwitz Group Inc. in Framingham, Mass.

"Using XML for security ...

XML Security

Highlights of the new protocol:

■ Aims to allow easier integration of digital signatures and encryption into XML pages.

■ Created by VeriSign, Microsoft and WebMethods Inc.

■ Would allow complex page functions to be placed externally on servers and accessed through programmed commands, rather than being built into applications.

enables folks to bring security mainstream, along with the e-commerce functionality XML is bringing to the online world," he said.

He called the proposed standard "like SSL on steroids," referring to the Secure Sockets Layer encryption technology built into Web browsers.

Several online retail companies contacted by Computerworld wouldn't comment on whether they will consider incorporating XKMS into their Web sites. Spokeswomen at Sears.com, CDNow Inc. and Landsend.com said their firms wouldn't discuss the technologies they use.

A review of the proposal could take 12 to 18 months before the standard could be adopted by the World Wide Web Consortium standards body. But because XKMS has been proposed by three of the biggest names in their respective businesses, its eventual adoption is likely, said Charles Kolody, an analyst at IDC in Framingham, Mass. ■



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Rick Rascitt—President, AT&T Business.



\$49k Wharton E-Business Program Draws 35 Execs

Senior executives cite opportunity to learn, network with one another

BY JEREMIAH DASH

THEIR 131 senior executives, from around the world, headed back to the classroom last week to learn about emerging business models in the New Economy — for \$49,000 a head.

The Wharton School of the University of Pennsylvania lured off its fellows in E-Business program, in which participants will spend three-and-a-half nonconsecutive weeks during the next four months, at leading courses around the world — in Philadelphia, Silicon Valley and Barcelona, Spain.

Life-long Network

One of the participants, Richard Poppe, director of human resources at Dearborn, Mich.-based Ford Motor Co., said he sees the program's price tag "as a long-term in-

vestment." Attendees aren't just paying for classroom learning, but also for a lifelong net work of key executives who are driving electronic business initiatives at their organizations, said Poppe.

For instance, if participating in the program leads to a joint venture with another company down the road, then the \$49,000 will seem "like a drop in the bucket," he said.

Tom Simon, senior director of e-business solutions at Schumacher, Ill.-based Motorola Inc., spent part of last week working on a project learning how e-business can help in implementing knowledge management initiatives.

David Foote, managing partner at Foote Partners LLC, a workforce consultancy in New Canaan, Conn., said the cost of the program seems a bit high, especially since Wharton benefits from it as well as the par-

ticipants. Professors gain valuable information for case studies and contacts for future consulting jobs. And Wharton MBA students can make contacts at major companies through the program's reverse-mentoring component, which pairs executives with Wharton MBA students.

Workers can find cheaper alternatives, Foote said. But, he added, the program can be valuable for executives, especially if they don't have MBAs. "Executives spend multiples of \$49,000 and get zilch in return from consultants and other experts," said Foote. In contrast, executive education lets

employees tap into a network of peers and generate ideas that can help in business.

Philadelphia-based Wharton will offer the program again in May, according to Jerry Wind, academic director of the program. He said about two dozen executives have already signed up for the spring session.

Poppe said that in the end, he hopes to learn how to leverage e-commerce to transform the way a company does business, which is one of Ford's top priorities.

"That's an small feat for a company with thousands of employees," he said. ■

Back to School

Some of the upcoming e-business education offerings for executives:

Northwestern University, Kellogg Graduate School of Management	Customer Relationship Management in the Network Economy	\$3,200 to \$3,800	Feb. 25-28, June 6-9, Sept. 26-29
	Sustainable Competitive Advantage in the Network Economy	\$3,200 to \$3,800	Dec. 3-5, April 1-4, Nov. 14-17
Carnegie Mellon University, Graduate School of Industrial Administration	Advanced E-Commerce Technologies	\$3,950	Jan. 6-8, March 28-30
	Advanced E-Marketing Technologies	\$3,950	March 5-8, Nov. 12-14
	E-Business Management program (three separate courses)	\$15,000 (\$5,000 per course)	One: April 9-13 Two: May 14-18 Three: June 10-22

10 Gigabit Ethernet Fast Becomes Reality for Some

BY JAMES COPE

While the 10 Gigabit Ethernet standard has yet to be ratified, the technology is already on the way in some metropolitan-area networks (MANs). And it promises a faster, clearer way to boost bandwidth — in minutes, in-

stead of months, in some cases.

That's why it appeals to companies like Yard Interactive, a Web site development and hosting provider in New York.

Yard develops Web sites for organizations such as The New York Times Co. and Deloitte Touche Tohmatsu in New York. The company, which also owns and operates Fertile Thoughts Inc., signed on with MAN provider Interspace Inc. last year. New York-based Interspace is using 10-Gigabit Ethernet technologies provided by Santa Clara, Calif.-based Extreme Networks Inc., even though a standard hasn't yet been adopted.

Although companies can use capacity on Interspace's all-

optical network to connect offices in different buildings, Yard President and CEO Doug Sukoloff said his primary requirement is connecting his servers to the Internet.

Sukoloff said his company's bandwidth requirements are continually increasing. "We started off with Interspace at 5M bit/sec," he said. "At the moment, we have 30M bit/sec, and we're just about to increase again — possibly double it. And in nine months, we

could double it again."

Turning up more bandwidth is no big deal, Sukoloff said, because the optical fiber link that Interspace has connected at his building is capable of as much as 10G bit/sec.

"We can turn up bandwidth in about an hour," Sukoloff said. "It would take six to nine months to get that kind of pipe in your building [from a phone company]." The cost on a per-megabit basis is about the same as ordering multiple T1 lines.

Although the network is running on 10 Gigabit Ethernet technology ahead of ratification of the standard, Stan Schatt, an analyst at Giga Information Group Inc. in Cambridge, Mass., said it's not unusual to have equipment in the field before standards are finalized.

He added that he expects 10 Gigabit Ethernet to be widely adopted both in MANs and low backbones in large campus settings. ■

10 Gigabit Ethernet

- Final standard expected to be set soon
- Used in backbone for... and... and... and...
- Compatible with existing... and...

CA Updates Platinum Tool

BY LUCAS MARIAN

Computer Associates International Inc. last week released an upgraded version of a software tool that lets business managers modify applications as corporate needs change, adding a Web-based user inter-

face and other new features to the package.

The Atom 90 tool, a legacy of CA's acquisition last year of Platinum Technology Inc., can also be integrated with the Blendin, NY-based vendor's Neupoints predictive-analysis

technology and its Jasmine II application development and e-business software.

Neupoints, a neural-network-based technology that uses advanced pattern-recognition and neural network techniques to find patterns within large amounts of data, can be called from within Atom applications to supply business-related predictions, CA said. ■

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AT A GLANCE

10 Gigabit Ethernet

▲ Runs on optical fiber

■ Final standard expected to be ratified next year

■ Used in backbones for metropolitan-area and corporate wide-area networks

■ Compatible with existing Ethernet standards

CA Updates Platinum Tool

BY LUCAS MEARIAN

Computer Associates International Inc. last week released an upgraded version of a software tool that lets business managers modify applications as corporate needs change, adding a Web-based user inter-

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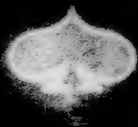
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Continued from page 1

Canada

"In some cases, [the law] is going to create some interesting nightmares" for companies, said Murray Long, a privacy consultant in Ottawa. Long cited the case of a Canadian affiliate that stores its data in U.S.-based servers.

"How do you ensure that the [privacy compliance] safeguards on the U.S. corporate network are up to par?" he said.

Contractual Requirements

The Canadian law will likely force many U.S. companies that exchange personally identifiable information with Canadian firms and subsidiaries to have a contract that commits them to following Canada's law, say legal experts.

"A multinational company operating in Canada will have to have dozens and dozens of contracts with everybody who supplies them with any personal information, including their own subsidiaries," said David Aaron, a former official at the U.S. Department of Commerce who negotiated the European "safe harbor" agreement and is now an attorney at Dorsey & Whitney LLP in Washington.

And even though it may take three years before the law affects all U.S. firms doing busi-

ness in Canada, the lack of a grandfather clause — which would have exempted data collected prior to the law's enactment — may force companies to begin seeking an individual's consent well before any deadline, legal experts noted.

If a company doesn't have the consent of the individual on the day the law takes effect, it won't be able to use that person's information, even if his data was collected years ago, said Brian C. Keith, an attorney at Borden Ladner Gervais LLP in Toronto.

Some companies, such as American Express Co. in New York, prepared long ago to adapt to the law. Amex already follows the Canadian Standards Association's model code on privacy, on which the act is based, said Sally Cowan,

the company's chief privacy officer. As a result, she said, the law will have "no impact" on Amex.

Canadian privacy advocates maintain that the new privacy

law will help businesses.

"Consumers are more and more asking about privacy policies, and I think that organizations that have good policies and procedures in place

will be able to sort of turn [privacy compliance] to their advantage," said Heather Black, a legal advisor at the Office of the Privacy Commissioner of Canada in Ottawa. ■

Few Takers for European Safe Harbor Agreement

Most U.S. firms take wait-and-see stance

BY PATRICK THIRODEAU

U.S. companies are so far steering clear of the "safe harbor" European privacy agreement, which is intended to provide

some legal protections for firms operating in Europe, where personal privacy laws are more strict than in the U.S.

Only three entities have signed up for safe harbor protections since the U.S. Department of Commerce began making them available Nov. 1. But it's unclear at this point

whether the slow start is an indicator that the agreement is doomed.

A Commerce Department official, speaking on background, said the department gets approximately 20 calls per day from businesses seeking information about the safe harbor. Officials are still in the learning stage, the official said.

James Sheine, manager of government affairs at the European-American Business Council, a Washington-based organization that represents 85 multinational firms, said many companies are taking a wait-and-see approach, especially since the Europeans aren't expected to review the success or failure of safe harbor until the

Continued from page 1

Chicago

quest for proposals is scheduled to follow in early spring.

Joe Mambretti, director of the International Center for Advanced Internet Research at Northwestern University in Evanston, Ill., and a key member of the CivicNet infrastructure committee, said the project is aimed at creating a next-generation optical MAN — essentially, a wide-area network that can carry data, voice and video throughout the greater Chicago area.

The network, as envisioned, would provide broadband access to government agencies, businesses, medical facilities and educational institutions, Mambretti said.

Development of CivicNet will depend on interested vendors and user companies working with the Mayor's Council of Technology Advisors, a group chaired by Chicago Mayor Richard M. Daley that includes representatives from local government, business and academia.

"Technology comes from the private sector, and that's why in the early stages of planning CivicNet we decided to put public and private together," Daley said last week in an interview with ComputerWorld.

But "the city does not wish to be in the provider business," Mambretti said. "The city is

basically saying, 'Here are the requirements,' which gives the provider and vendor community the opportunity to respond."

Mary Regan, an analyst at The Yankee Group in Boston, said what makes Chicago's approach unique is that it's taking a position similar to an anchor tenant in a shopping mall. The city is not only offering its rights-of-way for fiber runs to participating network builders and service providers, but it's also willing to transfer the \$30 million it currently pays in annual telecommunications fees to vendors that participate in the initiative.

Too Soon to Tell Cost

As of last week, hundreds of companies had responded to the informational request via a Web site devoted to the project (www.chicagocivicnet.net), said CivicNet project director Doug Power, who works at Chicago's Department of General Services.

But Power said that it's too early to tell how much it will cost to develop CivicNet, which is expected to take 10 years to complete.

Power likened the CivicNet plans to projects in which local governments build roads, waterworks, sewers and airports to entice companies to move in

or to prevent them from going elsewhere. In today's e-business era, he said, big cities like Chicago need to provide access to high-speed networks.

According to Daley, companies locating or expanding in Chicago "are always asking about the type of telecommunications infrastructure that's available."

Power said the network would be phased in over time to carry all city government and institutional data, voice and video communications. Providers participating in the initiative could then offer a variety of information services over the same fiber to businesses and residential users, he said.

The CivicNet project "provides a way to aggregate need and supply," said Michael Silverman, a partner at the Chicago office of law firm Duane, Morris & Heckscher LLP. "It's a great use of the city's ability to bring together various constituencies."

Chicago officials hope to sign contracts with vendors by the end of next year, Power said.

He added that it's unlikely that any single vendor could handle the job of building and operating the network, which is expected to be based on Ethernet standards. ■



MAYOR DALEY: Firms always ask about the city's telecom infrastructure

There is a lot of confusion out there.

DAVE STEER, SPOKESMAN, TRUSTE

middle of next year. "There's no rush to participate," said Sheire, at the Privacy & American Business conference in Washington last week.

The safe harbor provides guidelines for U.S. companies transferring data out of Europe. U.S. firms are considered in compliance with Europe's data protection laws if they voluntarily agree to follow a certain set of privacy practices. The European Commission approved the deal in July.

"There is a lot of confusion out there," said Dave Steer, a spokesman for Truste, a firm in San Jose that certifies companies' Web site privacy practices, referring to the safe harbor agreement. Truste will certify Web sites that comply with the agreement, but it's going to take education to convince companies of the need for safe harbor certification, he said. ■

Northern Exposure

On Jan. 1, financial institutions, telecommunications firms, transportation companies and other regulated entities will have to follow Canada's new privacy law. By 2004, all companies doing business in Canada will be subject to it. The law provides the following privacy protections for Canadian citizens:

Accountability: A company must designate someone as the privacy point person.

Who gets the data: Companies must disclose how data is used.

Consent: Citizens must approve the use of their data.

Access: Organizations must provide access to the data that's collected.

"I don't know"

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Co-op to Certify Tools to Measure Level of Security

But some fear risks of formation of anonymous database for sharing info

BY DAN VERTON

NO AMOUNT of preflight checks can guarantee that a plane won't fall out of the sky, and yet the airline industry is required to conduct those checks before takeoff. It's a condition of doing business that the airlines and their customers understand and accept.

Soon, the same may be true for companies that want to connect their computer systems to the Internet.

The Bethesda, Md.-based Center for Internet Security (CIS), a nonprofit cooperative enterprise, plans to release a series of global benchmarks that will let firms measure and monitor the security status of systems connected to the Internet. The CIS was formed

less than two months ago by more than 80 private companies, government agencies, academic institutions and consulting firms.

These benchmarks, or security rulers, will enable companies to select a specific level of security and then use certified third-party tools to validate that their systems meet minimum standards of operation.

The CIS will release its first benchmark for Sun Microsystems Inc.'s Solaris operating system in the next few weeks, according to Clint Kreitzer, CIS president and CEO, who at a meeting in Washington last week encouraged a group of government and industry security professionals to join. Future releases will cover Linux, Windows 2000, Windows NT, HP-UX, IBM's AIX, Silicon Graphics Inc.'s Irix and even-

tually, individual applications.

The CIS is based on the notion of collective action, said Kreitzer, adding that charter member companies get to review, comment and vote on the draft benchmarks. "None of us can do this by ourselves," he said. "The necessity of collective action is clear."

Charter memberships are available through December at \$20,000 for consultants or organizations and \$10,000 for individuals, said Kreitzer.

User Apprehension

A senior White House official who attended the meeting called the CIS a unique effort to create a security consortium of Internet users. "We have all sorts of consortiums for vendors, but nobody has ever created a consortium that represents the interests of users," said the official, who requested anonymity.

Users were less enthusiastic, however, about another plan

Center for Internet Security

www.CISecurity.org

• More than 80 charter members, including financial, manufacturing and utility companies

• Charter membership opens through December

• Open to individuals, user organizations, consulting firms and security software/service providers

by the center — to make available an anonymous database that would allow companies to compare their security status with that of their peers. Some users who attended the briefing expressed concern about the database and the potential for leaks of sensitive or proprietary information. They said they are concerned that the automated tools used to report their "anonymous" configura-

tion data might also inadvertently capture network maps and other data.

Franklin Reeder, chairman of the CIS, downplayed the security risks related to CIS membership. The center is about "making the business case and giving the marketplace clear signals of what works and what doesn't" in the realm of Internet security, said Reeder.

"People are hungry for yardsticks," said Alan Paller, director of research at the SANS Institute in Bethesda, Md. "Only a few of the consulting organizations who have their own proprietary rating systems will find these public rulers problematic, but they will come around very quickly once their clients discover the value."

Bill Crowell, CEO of Cylinc Corp. and a former deputy director of the Fort Meade, Md.-based National Security Agency, called the CIS effort "a precursor to the ultimate need" to establish broad standards that companies and organizations can use to measure their vulnerability and liability. "Minimal performance standards are achievable," said Crowell. Cylinc is a Santa Clara, Calif.-based provider of public-key infrastructure security systems. ■

Continued from page 1

Cybersecurity

the coordinating committee of the NPCIS acknowledged that progress hasn't proceeded at the same pace in all sectors.

"I have talked personally to the sector coordinators, and they are all working feverishly at this," said Watson, who's also manager of critical-infrastructure protection at Cisco Systems Inc. in San Jose. "There are some sectors that are ahead of others. However, we accept the challenge that the government has given us to protect the networks that run our infrastructure."

One indicator of progress is the pending announcement of an Information Sharing and Analysis Center (ISAC) for the IT community, similar to the ISAC that already exists for the financial services sector. The ISAC offers a secure database, analytic tools and other soft-

ware that allow officials to submit reports about information security threats, vulnerabilities, incidents and solutions.

Addressing Obstacles

Tim Atkins, a member of an NPCIS working group, said the IT sector has been moving very aggressively. Any perceived slowness is due to a genuine desire by industry to protect proprietary and sensitive information on behalf of their companies, their shareholders and their clients, said Atkins, who is director of critical-infrastructure protection at consulting firm SRA International Inc. in Fairfax, Va.

Thomas R. Horton, chairman of the National Association of Corporate Directors and a participant in several recent critical-infrastructure protection summit meetings, said corporate concerns regarding shareholder value and increased competition may be getting in the way of security progress at some banks, air-

lines and telecommunications companies.

Despite the banking industry's perceived success in the area of security, a recent spate of money laundering schemes in the banking industry, including a \$1.4 billion scam against Citigroup Inc. and Commercial Bank of San Francisco that lasted nine years, raises serious questions about the status of security in the industry, said Horton.

Likewise, the airline and telecommunications sectors have come "under siege" as a result of deregulation and the current climate of mergers and acquisitions, said Horton. A senior White House official said years of a "systematic underinvestment in [electric power] grid capacity," combined with the effects of wholesale deregulation, has created a "potentially perilous [security] situation."

But two CIOs from the natural gas and electric industries said that security protections against cyberattacks in their

industries are being addressed constantly, although the national effort lacks a useful gauge for how much security is enough.

"If you don't have any attacks, it's easy to let the program slip," said Jon Arnold, CIO at the Edison Electric Institute in Washington, a trade association that represents 100 investor-owned electric utilities.

What's It All For?

Gary Gardner, CIO at the American Gas Association in Washington, said he sometimes wonders what the industry gets in return for its cooperation with the government. "To some extent, I don't know what sharing all this information achieves for us, which is what the oil industry has said as well," said Gardner, adding that FBI warnings on the "I Love You" virus didn't arrive until two hours after it hit his company's offices.

Bruce Freeman, CIO at Burlington Northern Santa Fe

Corp. (BNSF) in Fort Worth, Texas, said his company became concerned about infrastructure security four years ago, partly because a security consultant was able to persuade 97 out of 100 BNSF employees to divulge their system passwords and user IDs.

Freeman said the railroad immediately entered into an aggressive training campaign to educate employees to be more secure. He said the company also beefed up its infrastructure security.

Gene Gorenzlik, a spokesman for the North American Electric Reliability Council (NERC) in Princeton, N.J., said all the sectors are making progress, but admittedly at different speeds. "You can't build something from nothing overnight," he said.

The NERC is presenting written recommendations for the Clinton plan. ■

Linda Rosenbaum contributed to this story.



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In the Navy, Danger Is Just Part of the Tech Scene

Crew of 5,000 aboard USS Constellation orchestrate aircraft ballet with tech tools

BY PHAM FOX

THE ASSIGNMENT seemed easy: Fly out to the aircraft carrier USS Constellation, find out what kind of IT keeps this moving airport afloat and return to base.

Of course, no one mentioned the noise, the cold or the overpowering smell of jet fuel.

And did I mention the noise? There are several kinds.

First, there's the noise of the propeller plane, which we enter from the rear and sit in facing backward. During our flight to the Constellation, the engines are so loud, we have to wear large noise-mufflers. There's also the danger of airborne particles, so we don't face masks.

The airplane, a C-2A Greyhound, known affectionately as a COD — short for "carrier onboard delivery" — looks like the inside of a tractor trailer, what with the wires, rigging and exposed rivets. Its primary task is to haul cargo — as much as 10,000 pounds of spare parts, mail and people — out to the carrier. As the plane rocks back and forth during its 90-minute flight, Petty Officer Brian Anderson, originally from New Smyrna Beach, Fla., uses a slide rule to check the weight and balance of the aircraft to determine whether we're in its center of gravity.

When we land, it smells as if someone has saturated the air with gasoline fumes. We're told we can remove our seat belts, and an escort is designated to get us off the flight deck and into the bowels of the ship.

We're ushered up and down several flights of steps before we're led into what could be a small executive office suite, complete with a large-screen TV and fluorescent lights.

There's a loud roar in the distance, and the room shudders ever so slightly. The steam catapults have just launched

another airplane from the ship. Today, the carrier is hosting flight qualifications, during which 60 to 70 aircraft will take off and land into the night — all night.

I ask the public affairs officer, Lt. Charlie Brown, where the IT is that runs all this — the scheduling of crews, the supplies, the day-to-day operations. He matter-of-factly tells me that the IT center is beneath the photo lab on the third deck (see story below). But wouldn't I first like to go up and see the "air boss" — the person who gives the final OK to launch the aircraft?

What better way to experience the energy and commitment of the sailors and airmen than to watch them do what they're all focused on: safely launching and landing planes.

A Well-Oiled Machine

For the next 18 hours, F-16s, F-4s and assorted other planes and helicopters are shifted around like Tinkertoy in a precise ballet that combines sight, sound and smell. It's an impres-

sive demonstration of coordination, planning and execution. The plans are launched with a deafening explosion after quick calculations of jet fuel consumption, wind speed and temperature. They land with an equally car-splitting bang, stopped by an arresting cable.

All night long, fuel tanks are filled, steam pressure is generated and communications crackle among deck crews, air chiefs, pilots and air bosses. The air chief runs the show, while air bosses work about 30 feet from the noise of fully loaded, full-throttle supersonic aircraft.

We're taken down into the nether reaches of the ship to the Combat Direction Center (CDC). Bathed in bluish light, the fiercely air-conditioned room contains about half a dozen men ranging in age from 18 to 45.

On the various screens — yes, it looks like it does in the movies — a computer-enhanced air detection system tracks a multitude of airplanes. Four warfare modules compile data and relay it to the tactical action officer and display it in real time on large computer screens. This is how the ship knows what's going on with the planes that are aloft.

Using an encrypted radio satellite system, seamen Roy Kim and Randy Espinal can monitor in real time how much fuel an aircraft has, how fast it's traveling and how its on-board avionics are working. One aircraft is diverted to land

the decision-making process."

Overall, the technology designed for external, combat-related communications doesn't seem like an operation requiring *Star Wars*' George Lucas. But it does appear as if it's been built to withstand lots of use and abuse. We never hear that a system is down or that something doesn't work. Indeed, the staff's commitment to maintenance and training is almost palpable.

Heading to our bunks for the night, we cross the hangar bay, where multimillion-dollar



SEAMEN Roy Kim and Randy Espinal (right) use a radio satellite system to monitor aircraft aboard the USS Constellation.

onshore because it is remotely confirmed that something is wrong with its gyroscope.

As the nerve center for defense of the ship, the CDC is a vital clearinghouse for information. Chief Warrant Officer Bruce Kesinger of San Diego says the "amount of information that flows into the CDC helps

aircraft are being assembled and disassembled with the care you hope a doctor gives a patient.

Yet despite the noise and amount of activity, there is no sense of overriding pressure; just calm diligence and concentration — an engineer's dream come true. ■

USS Constellation's IT Center Toils in Bright Shadows

Seeming almost like an afterthought, the USS Constellation's IT center is located in a nondescript room measuring 25 by 15 feet, many ladders down into the perpetual fluorescent brightness of the IT story shop.

We greet several members of the 40-person IT staff. Metal desks are pushed together and sparsely cluttered. There are no windows, and the temperature is about 58 degrees. There's no place to sit.

This center serves the ship's crew of more than 5,000 people, who communicate with family and friends via e-mail dispatched through a hub in Hawaii. The IT group also supports highly classified ship-to-ship communications. Petty Officer 2nd Class Albert

Sandoval has spent the past three years attending to all these "customers." For Sandoval, the term isn't a marketing concept.

"When you have 5,000 customers every day who are your face and depend on you, you want to give them good service," says Sandoval, as he maps out the configuration of the ship's routers. "We send out all the e-mail via secure superhigh frequency satellite channels to Hawaii. You bet we have to get that right all the time."

Systems onboard include 600 Windows NT workstations, 40 servers and a PC-based system for ordering parts and supplies for the carrier's complement of 70 aircraft. Using a Hewlett-Packard Co. Unix system, the IT center keeps

price lists, job requests and reports on as many as 20,000 supply items for the ship. Sandoval, who has a background in data processing, says the system has its quarks.



NAVY OFFICER Albert Sandoval serves the ship's 5,000 e-mail users.

During the past six months, he says, the "Unix system kept crashing. It wouldn't see the network,

We think it was an HP error, but we were able to send the data to San Diego [the ship's home port], where they are able to offer supplies and maintenance by the time we dock."

Sandoval, who's originally from Fort Worth, Texas, has another year to go on his Navy contract. He says he knows that earning \$7,000 per month is to be responsible for this Microsoft Exchange IP network is a little low. Is he dreaming of landing a better-paying IT job in the private sector?

Well, Sandoval says, he doesn't know. He says he likes the job as being in the Navy, and he likes working with IT. But most of all, "being in the Navy is like being in a family. It is hard to explain, but we each depend on each other. I'm not sure you can buy that."

—Pham Fox



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NSA Considers \$5B Outsourcing Pact

To contract for non-mission-critical IT

BY DAN VERTON

The National Security Agency (NSA) is super-secreting communications intelligence arm of the Pentagon, next month plans to open its doors to industry with a request for proposals (RFP) for a contract to outsource the majority of its non-mission-critical IT infrastructure.

The 10-year, \$5 billion initiative, called Project Groundbreaker, is the result of a 15-month NSA study to deter-

mine if the agency's IT infrastructure needs could be met more efficiently through a massive outsourcing agreement with the private sector.

If awarded, the deal would be the second-largest government outsourcing pact in history. In October the Navy awarded Platts, Texas-based Electronics Data Systems Corp. a \$6.9 billion contract to build an intranet infrastructure for the Navy and Marine Corps.

The Fort Meade, Md.-based NSA is known as the signals intelligence arm of the U.S. De-

partment of Defense, tasked with intercepting and analyzing vast arrays of foreign military and national security-related communications. The pace of technological change in recent years, including advances in encryption, the spread of fiber-optic cable and the increasing volume of Internet communications has made infrastructure modernization a top priority for the agency.

However, Project Groundbreaker is limited to administrative and logistics functions, and won't involve turning data collection or analysis over to a third party, NSA officials said.

Project Groundbreaker has

been designed to reverse what NSA director Lt. Gen. Michael Hayden has characterized as years of modernization neglect at the agency. The project could affect the jobs of as many as 5,000 agency employees who may or may not be hired by contractors, according to NSA officials.

Three Prime Contractors

The NSA has prequalified three prime contractors to bid for the project: AT&T Corp.; El Segundo, Calif.-based Computer Sciences Corp.; and Greenbelt, Md.-based ODO Corp. Representatives from each of the firms declined to comment before NSA releases the RFP next month.

John Pescatore, a former NSA analyst and now an information security analyst at Stamford, Conn.-based Garron Group Inc., said Project Groundbreaker is a departure

AT A GLANCE Breaking Ground

Services to be covered by Project Groundbreaker include the following:

- Database computing
- Network operation, maintenance and administration
- Desktop and application installation, maintenance and support
- Help desks
- Telecommunications support
- Enterprise management
- Information assurance and information systems security
- E-mail services

from what the NSA has done in the past. "Service-level agreements will be used and the contractor will manage all the resources," he said. ▀

Merck to Invest \$100 Million In Online Health Start-ups

BY TODD R. WEISS

Pharmaceuticals vendor Merck & Co. last week announced the formation of a subsidiary that will be given \$100 million to invest in private online start-ups and other emerging companies focused on marketing and distributing pharmaceuticals and related health care services.

Already the operator of one of the top online pharmacies through a Web site run by its Merck-Medco Managed Care LLC unit, Whitehouse Station,

NJ-based Merck said it hopes to use the new Merck Capital Ventures subsidiary to expand the services it offers via the Internet to doctors, patients and pharmacists.

Merck Capital Ventures will begin searching for investment opportunities immediately. But it said its \$100 million fund won't be used to invest in any research-based pharmaceutical, vaccine or biotechnology companies.

All Kinds of Possibilities

Instead, a company spokeswoman said, the investment opportunities being eyed by Merck include start-ups that offer new ways to find patients for clinical drug trials or to inform doctors and pharmacists about new drugs. "We're open to all kinds of possibilities that we see as innovative and [that provide] ways to improve our business," she said.

Merck Capital Ventures will be based in Montvale, N.J., and will be headed by For G.H. Lofberg, who resigned last week from his job as CEO at Merck-Medco to become president of the new subsidiary.

Jim Williamson, an analyst

at U.S. in Framingham, Mass., said Merck's investment strategy makes sense as an adjunct to the Merck-Medco online pharmacy. "It tells me what they're doing is bucking up their leadership position in that area with capital investments in other areas," he said.

An increasing number of

prescriptions are likely to be filled online, and many doctors are expected to start sending prescriptions directly to pharmacies via wireless devices, Williamson said. That would significantly change the pharmaceutical business, he added.

Merck realizes "that the way people get their prescription

drugs is going to be changing," Williamson said.

"And they want to be the ones doing the innovation, or at least [funding] the innovation, instead of being surprised by it," he said. "It's their playing from a position of strength using what they have, which is lots and lots of money." ▀

IBM Follows Chief Privacy Officer Trend

BY LINDA ROSENCRANCE

IBM last week named a chief privacy officer, joining the increasing number of companies that are appointing executives to oversee their data privacy policies and initiatives.

Harrison Pearson has worked at IBM in jobs related to public policy since 1993, will take on the new role Pearson will guide the company's privacy policies and practices and also "lead initiatives across IBM that will strengthen consumer privacy protection," the company said.

IBM's announcement comes at a time when data privacy issues are being closely scrutinized by consumer advocates

and government officials. For example, the Federal Trade Commission is pushing for privacy regulations after a survey earlier this year of 355 Web sites showed that only 20% offered privacy protections.

As a result of the increased focus, companies are appointing chief privacy officers to establish corporate data-privacy policies. There may be fewer than 75 chief privacy officers in place now, but that number is expected to increase rapidly.

"This is definitely a growing trend," said Andrew Shen, a policy analyst at the Electronic Privacy Information Center in Washington. "And more companies... are thinking seriously about hiring CPOs to look at the privacy implications of business and technology."

IBM said Pearson will focus on unifying its ongoing privacy

programs worldwide. Pearson, 37, is also charged with ensuring that IBM adheres to evolving consumer privacy guidelines and follows all applicable laws and standards.

IBM CEO Louis V. Gerstner said in a statement that privacy isn't so much a technology issue as it is a policy issue.

Companies "should think of privacy issues historically, looking at [both] internal and external practices," said Shen.

In addition to her job at IBM, Pearson chairs the Privacy Committee of the Information Technology Industry Council and serves on the board of the Internet Education Foundation and on the BBOnline Privacy Seal Program's steering committee. She's also a member of the executive committee of the CEO-Level Privacy Leadership Initiative. ▀

Cyberdrugs

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■ Is based in Montvale, N.J., and headed by President For G.H. Lofberg, former CEO of Merck-Medco Managed Care.

■ Won't invest in any research-based pharmaceutical, vaccine or biotechnology companies.

■ Will pursue initiatives such as providing new ways for doctors, pharmacists and patients to get information about products and developing ways to deliver to end-users information about products and services.



PEARSON will guide IBM's privacy policies.

NSA Considers \$5B Outsourcing Pact

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AT A GLANCE

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Pharmaceuticals vendor Merck & Co. last week announced the formation of a subsidiary that will be given \$100 million to invest in private online start-ups and other emerging companies focused on marketing and distributing pharmaceuticals and related health care services.

Already the operator of one of the top online pharmacies through a Web site run by its Merck-Medco Managed Care LLC unit, Whitehouse Station,

N.J.-based Merck said it hopes to use the new Merck Capital Ventures subsidiary to expand the services it offers via the Internet to doctors, patients and pharmacists.

Merck Capital Ventures will begin searching for investment opportunities immediately. But it said its \$100 million fund won't be used to invest in any research-based pharmaceutical, vaccine or biotechnology companies.

All Kinds of Possibilities

Instead, a company spokeswoman said, the investment opportunities being eyed by Merck include start-ups that offer new ways to find patients for clinical drug trials or to inform doctors and pharmacists about new drugs. "We're open to all kinds of possibilities that we see as innovative and [that provide] ways to improve our business," she said.

Merck Capital Ventures will be based in Montvale, N.J., and will be headed by Per G.H. Lofberg, who resigned last week from his job as CEO at Merck-Medco to become president of the new subsidiary.

Jim Williamson, an analyst

at IDC in Framingham, Mass., said Merck's investment strategy makes sense as an adjunct to the Merck-Medco online pharmacy. "It tells me what they're doing is backing up their leadership position in that area with capital investments in other areas," he said.

An increasing number of

prescriptions are likely to be filled online, and many doctors are expected to start sending prescriptions directly to pharmacies via wireless devices, Williamson said. That would significantly change the pharmaceutical business, he added.

Merck realizes "that the way people get their prescription

drugs is going to be changing," Williamson said.

"And they want to be the ones doing the innovation, or at least [funding] the innovation, instead of being surprised by it," he said. "It's them playing from a position of strength using what they have, which is lots and lots of money." ■

IBM Follows Chief Privacy Officer Trend

BY LINDA ROSENBERG

IBM last week named a chief privacy officer, joining the increasing number of companies that are appointing executives to oversee their data privacy policies and initiatives.

Harriet Pearson, who has worked at IBM in jobs related to public policy since 1993, will take on the new role. Pearson will guide the company's privacy policies and practices and also "lead initiatives across IBM that will strengthen consumer privacy protection," the company said.

IBM's announcement comes at a time when data privacy issues are being closely scrutinized by consumer advocates

and government officials. For example, the Federal Trade Commission is pushing for privacy regulations after a survey earlier this year of 355 Web sites showed that only 20% offered privacy protections.

As a result of the increased focus, companies are appointing chief privacy officers to establish corporate data-privacy policies. There may be fewer than 75 chief privacy officers in place now, but that number is expected to increase rapidly.

"This is definitely a growing trend," said Andrew Shen, a policy analyst at the Electronic Privacy Information Center in Washington. "More and more companies... are thinking seriously about hiring CPOs to look at the privacy implications of business and technology."

IBM said Pearson will focus on unifying its ongoing privacy

programs worldwide. Pearson, 37, is also charged with ensuring that IBM adheres to evolving consumer privacy guidelines and follows all applicable laws and standards.

IBM CEO Louis V. Gerstner said in a statement that privacy isn't so much a technology issue as it is a policy issue.

Companies "should think of privacy issues holistically, looking at [both] internal and external practices," said Shen.

In addition to her job at IBM, Pearson chairs the Privacy Committee of the Information Technology Industry Council and serves on the board of the Internet Education Foundation and on the BBONline Privacy Seal Program's steering committee. She's also a member of the executive committee of the CEO-Level Privacy Leadership Initiative. ■



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POINT OF VIEW

The TaskSmart H-Series Compaq and Microsoft redefining enterprise storage
Based on Microsoft Windows 2000 the new TaskSmart H-Series Network Attached Storage (NAS) appliance from Compaq makes it easy to deploy and manage advanced file storage.
www.windows2000advantage.com/pov/09-29-00_tasksmart.asp#300

TECH EDGE

Microsoft and Compaq take aim at ASP model
Microsoft and Compaq were at the recent IDG ASP World Conference with an impressive array of product and support offerings. This article looks at Microsoft and Compaq and the rapidly emerging ASP environment.
www.windows2000advantage.com/tech_edge/10-25-00_aim_at_esp.asp#300

Q & A

Microsoft VP Jim Ewel portrays Windows 2000's role in the business Internet
Jim Ewel, vice president, Windows .NET server marketing, has played an important role in some of Microsoft's prominent products. He discusses initiatives, which revolve around Windows 2000 and .NET.
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COLUMNS

Implementing service levels key to .NET success
Microsoft recently unveiled its .NET platform in San Francisco. The .NET platform evolves the current DNA programming model into one that is more in tune with the World Wide Web.
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CASE STUDIES

Windows 2000 lever can be infectious. Just ask Datafarm.com
After testing Microsoft Windows 2000 Advanced Server as part of Microsoft's Joint Development Program, Datafarm.com lost no time migrating its own Web site and customers' shared Web servers.
www.windows2000advantage.com/case_studies/09-18-00_infectious.asp#300

Q&A >

Brian Valentine: Chief cheerleader, driving force

Brian Valentine is a key player in Microsoft's Windows division, where, in addition to being "chief cheerleader," as he describes himself, he is also a driving force behind the evolution of Microsoft Windows 2000. A 13-year veteran of the company, he started as an engineering manager and worked his way up the ranks to manage the Microsoft Exchange and Microsoft BackOffice family product units. He recently spoke to Windows 2000 Advantage editorial director Bruce Hoard about the evolution of Windows 2000.

For the full story, visit: www.windows2000advantage.com/300

2000 GENERATION >

Aventis Pharma simultaneously implementing Windows 2000, Exchange 2000

Tackling a Windows 2000 implementation in itself is no easy task. Now imagine doing an Exchange 2000 rollout at the same time, while simultaneously upgrading hardware and the desktop – and you get an idea of the challenges currently faced by Aventis Pharma.

For the full story, visit: www.windows2000advantage.com/2000gen/11-13-00_aventis.asp#300

CASE STUDY >

Windows 2000 Group Policy can cut support costs, but requires up-front planning, training and testing

The Group Policy features within Microsoft Windows 2000 can make it easier to fine-tune user access rules and even lock down desktops so users can't fiddle with their systems. But moving to Group Policy from the Microsoft Windows NT 4.0 domain structure requires a lot of planning, training and testing.

For the full story, visit: www.windows2000advantage.com/case_studies/11-06-00_grouppolicy.asp#300

www.Windows2000Advantage.com/300

MOMENTUM SERIES >

As Windows 95 phases out, Microsoft and Compaq offer tools to ease the move to Windows 2000 Professional

Five years after its introduction, Microsoft Windows 95 is nearing retirement. For business customers still running Windows 95, upgrading to Microsoft Windows 2000 Professional will create far more stable and manageable client workstations. Microsoft and Compaq are offering a variety of support tools and services to ease the migration pains.

When Windows 95 was first introduced, it was a major leap in reliability and ease of use for Windows clients. But during the five years since, Microsoft has upgraded its PC operating system offerings with Windows 98, Windows 98 Second Edition (SE), Windows NT 4.0 Workstation, Windows Me and Microsoft Windows 2000 Professional, which Microsoft and Compaq are promoting as mainstream client platform for business professionals.

Now, those customers who have stuck with Windows 95 "are pushing real hard for Windows 2000," says Richard Ashe, manager of PC Lifecycle Solutions at Compaq. "Those are the people in a hurry."

They're hoping that the improvements in Windows 2000 Professional, which is based on Windows NT technology rather than the older Windows 3.x code base, will make users' PCs more stable, faster-performing and easier to manage over time. Acknowledging that software upgrades can be difficult and expensive, both Compaq and Microsoft are offering migration tools to ease the shift to Windows 2000 Professional as Windows 95 moves toward retirement.

For the full story, visit: www.windows2000advantage.com/momentum/11-06-00_95phaseout.asp/300

QUOTE OF THE WEEK >

"Third-party vendors all say they're Windows 2000 ready, but if you don't do a test, you'll be in trouble."

— John Wolfe
systems analyst in
Energy Wholesale Operations
Entergy Corp.

What is Windows 2000 Advantage?

The mission of Windows 2000 Advantage is to become your primary source of timely, useful information for planning and implementing Microsoft Windows 2000 on Compaq solutions and services.

Windows 2000 Advantage is a Web-only magazine because that lets us bring you, the IT leader, great stories that apply to your day-to-day work. We'll keep you up to date with a weekly e-mail alert so you don't miss a thing.

Windows 2000 Advantage is underwritten by Microsoft and Compaq. Its charter is to address the issues that most concern IT managers charged with keeping their companies on top of the latest and best solutions Microsoft and Compaq have to offer. Toward that goal, we offer a wide range of stories including case studies, columns and news to provide you with information you can't find anywhere else.



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Vendors Form Web Business Consortium

BY LEE COPELAND

A bevy of technology vendors last week set a new industry consortium in motion, pledg-

ing that the nonprofit group will serve as a think tank to advise end-user companies on how to build Web-based com-

merce and business systems.

Analysts said the Portland, Ore.-based group, formed by eight vendors, including IBM,

Intel Corp., Microsoft Corp. and SAP AG, could fill an important services gap if it garners wide industry support and avoids partisan bickering.

Membership to the organization, called the Business In-

ternet Consortium (BIC), will be free for user firms. Joining the BIC will give users access to information on the group's best practices for implementing new technologies and to other reference materials.

Dwight Davis, an analyst at Summit Strategies Inc. in Boston, voiced concerns about whether a vendor-based organization could address technology challenges in a nonpartisan way. "There is a need out there, but will the consortium be able to pick and choose the appropriate targets without going into the dangerous realm of favoring one vendor's product over another's?" he asked.

In addition, the BIC's giving end users access to its methodologies for implementing new technologies may present a conflict of interest for members in the systems integration business, Davis added.

"We're not trying to usurp the role that analysts or systems integrators have," countered Keith Uebele, director of e-business architecture marketing at Intel. "But I think [end-users] will have more to gain if we work together on things like best practices."

Joining the Party

Thus far, about 25 technology vendors and five end-user firms, including Ford Motor Co. in Dearborn, Mich., and Capital One Financial Corp. in Falls Church, Va., have joined the BIC. San Francisco-based financial services firm Charles Schwab Corp. also joined the consortium, to help ensure that the technology vendors focus on practical technology implementations, said Neal Goldstein, senior vice president of architecture and planning at Charles Schwab.

"If you look at individual technologies, they're all great. But when they interact, they don't look so good," said Goldstein. "What we're really looking to do is herd a bunch of cats into a mile-long conga line."

"The consortium seems like an admirable undertaking, but some key players are missing," said Geoffrey Bock, an analyst at Patricia Seybold Group in Boston. "Organizations take time to develop, to get educated and grow up."

Top e-commerce vendors such as Ariba Inc., BEA Systems Inc. and Sun Microsystems Inc. aren't members of the organization at this time. ■



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Storage Rental Market About to Get Bigger

Storage service providers build credibility in hopes of luring larger corporate users

BY LUCAS NEWMAN

WHILE they still lack the credibility needed to entice many large corporate users, storage service providers (SSPs) that offer data storage capacity on a rental basis continue to grow and will likely be joined by more competitors in the coming months, according to a recent study by consulting firm Summit Strategies Inc.

Dot-com ventures and other start-up companies that are short on money and technical expertise and have unpredictable growth rates are the most likely customers for SSPs, said Boston-based Summit. The finding reinforces comments made earlier this year by users and analysts when storage rental companies were first emerging in the market.

Paying monthly per-gigabyte rental fees to an SSP gives users the potential to scale their storage capacities as business needs dictate, in a manner similar to the way

more-established application service providers (ASPs) work with their customers.

"I see the hosted-storage model as almost a subset of the whole ASP model," said Summit analyst John Madden, the author of the study. Both approaches offer users the prospect of increased simplicity and lower IT costs compared with running applications or storage farms internally, he added.

TechTarget.com Inc., a Needham, Mass.-based company that operates a range of IT-oriented informational Web sites, is a case in point. TechTarget rents its data storage from Storage Networks Inc., an SSP in Waltham, Mass. The year-old company struck the arrangement in order to get its business up and running more quickly.

"It was one less thing our IT guys had to worry about," said Greg Strakoski, TechTarget's CEO. "They had a very full plate building [our] Web infrastructure from scratch." Since opening in September last

year, the dot-com venture has doubled the amount of storage capacity it rents from Storage Networks to the current level of 2TB.

But while there's little disagreement that the SSP market is growing rapidly, some analysts contend that handling over management of sensitive data to an SSP is a step many companies aren't ready to take.

Gartner Group Inc. in Stamford, Conn., estimates that storage devices will make up 55% of server hardware costs for typical users next year, and Cambridge, Mass.-based Forrester Research Inc. estimates that there will be at least a five-fold growth in storage sales during the next few years. By 2004, according to Forrester analyst Joe Butt, the 100 largest companies in the world will have an average storage capacity that exceeds 150TB.

But most of the storage growth "will be topped up by internal installations or [by] ASPs" that are hosting key corporate applications for users, Butt said. Demand for storage rentals "will continue to rise, but it will be a slow rise, because [users] are going to be dealing with it in-house," he added.

Butt and Maddeo agreed that SSPs are currently facing a lack of credibility among large customers. But Madden said he expects that to be cured in time, as more users take the plunge.

"One way or another, the SSP model will take hold, for the same compelling reasons that the broader ASP model is catching on," Madden said.

Ironically, the battlefield in the storage rental market is expected to be between SSPs and the storage vendors from which they sometimes lease disk space. As demand increases, Madden said, vendors such as EMC Corp. and IBM will also likely begin offering capacity rentals, joining pure-play SSPs such as StorageNetworks, StorageWay Inc. in Fremont, Calif., and San Jose-based CreekPath Systems Inc., one of which sell storage equipment. ■

AT A GLANCE

Rent-a-SAN

Storage service providers face a number of challenges, including the following:

- Establishing credentials as trustworthy partners, which is more of a challenge for pure-play start-ups than recognized vendors.
- Pressure to capture positions at data-heavy vertical sectors such as entertainment and health care.
- An uncertain and competitive landscape among pure-play SSPs and storage vendors, which may move the market into an all-out competition for customers.

New AT&T Boss Looks Ahead

AT&T Corp., which has operated without a president since late last year, last week named David Dorman, 46, to fill the post. Dorman, previously CEO of Reston, Va.-based Concert, a joint venture of AT&T and London-based British Telecommunications PLC, spoke with *Computerworld's* James Cope about his new post.

Q: What are your key management challenges?

A: First of all, it will be to assess the things that need to be dealt with immediately and changed. My initial blush is we're doing more things right than wrong... It's just that things that are

going well are not getting a lot of airtime.

Q: What's going well?

A: Data services, for example, to business customers. AT&T has taken its growth rate there from the low teens in the first quarter of this year to the low 20s in the third quarter of this year, which we believe is faster than the market is growing at this point. So we're actually increasing our share in that very important market.

DORMAN: "We're doing more things right than wrong."

In my view, the future of business communications will be driven off of data networks, which will encompass, in large measure, a lot of the voice communications today that ride on separate facilities.

Q: What's the most significant business challenge facing AT&T?

A: I'd say it's just overall credibility [among investors]. We've got a great set of assets here, and we believe we're significantly undervalued.

We've just got to systematically regain the confidence of the marketplace from a financial perspective in order to get rewarded

for what our assets represent.

Q: What changes in technology will most impact your business going forward?

A: There's been an incredible investment flow into telecom. Largely, it's gone into optical transmission. Optical has been the basis of telecom for the last 10 years, but what's changed is the pace of innovation. The switching technology is getting better all the time to take advantage of that capacity, too.

But frankly... the issue that's coming to the forefront now is that [telecommunications] is about more than just building a physical network. It's about building services and products and then distribution channels to take those to customers. ■

BRIEFS

Oracle Grabs Former White House Aide

Oracle Corp. has announced that former White House press secretary Joe Lockhart has joined the company and will become a member of its senior management team, reporting directly to CEO Larry Ellison. Lockhart will focus on refining and communicating Oracle's business strategy, the company said in a statement. Prior to joining the White House staff in 1997, Lockhart was national press secretary for the Bill Clinton/Al Gore 1996 re-election campaign.

Covad to Cut Operations, Jobs

Covad Communications Group Inc. in Santa Clara, Calif., said it plans to cut its workforce by 15% and canceled the construction of a third operations site in Alpharetta, Ga. By taking these steps, the Digital Subscriber Line service provider hopes to cut its operational costs by 20% to 30% next year. Covad officials said layoffs will be made in all levels of the organization and will include operations, sales, marketing and support functions, affecting nearly 400 of Covad's half-time employees.

Short Takes

MICROSTRATEGY INC. in Vienna, Va., has made its chief financial officer head of some key day-to-day operations in a move aimed at nurturing customers and investors that the struggling data-analysis software vendor is addressing financial problems that emerged earlier this year.... **Embarcadero** (San Jose)-based speech-recognition technology vendor **LEARNOUT & HAUSPFE** SPEECH PRODUCTS INC. filed for Chapter 11 bankruptcy protection in the U.S. after failing to reach an agreement to get additional financing from its lenders.... **New York-based** Internet service provider **JUNO ONLINE SERVICES INC.** plans a trial run for offering high-speed Internet access over **COMCAST CABLE COMMUNICATIONS INC.** cable television lines in Philadelphia.... **COMMENCE ONE** (in Pleasanton, Calif.), has signed partnership deals with 11 electronic-marketplace providers in eight countries in Asia.

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AND YOU'RE ALL QUEES?



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MARYFRAN JOHNSON

My Geek Central

“WHAT ARE YOU DOING to my laptop?” I asked my home-based personal chief technology officer (a.k.a. the husband).
“It’s a surprise,” he said, ignoring my flinty gaze as best he could. **“You’ll like it.”**

Turns out he was installing a wireless LAN for our home network, and I must admit I do like it. The ability to surf the Web or answer e-mail while I’m at the kitchen table is a rather novel technick right now. “Do you have a good signal there?” is the question of the hour at my house, Geek Central. “Watch out for the antenna” is a popular admonition.

I’m sure the thrill will wear off soon, since my charming little town is still limping along without high-speed Internet access. Yet I still feel obligated to celebrate every time technology hands me another convenience or provides another service. Then again, this wireless LAN business opened up a can of technoworms I’d been ignoring for some time. What’s the story behind all those boxes from eBay filled with motherboards, keyboards and what have you?

“How many computers do we actually have in this house?” I asked my personal CTO.

“Up and running — or on cold standby?” he replied. That earned him another steely glare.

“Well, about three PCs and four to five Unix machines,” he admitted. “And whatever laptops



A mysterious antenna is hidden in chest of Computerworld. You can contact her at maryfran.johnson@computerworld.com.

are around.” That took the oomph out of about 10 active systems.

“So how many on cold standby?” Some hemming and hawing. Another seven in the wings, apparently. We’ve got naming servers, firewall servers, file servers, print servers, application servers...

“What are we trying to become — the local utility company? Got any mainframes in the mail?”

“I don’t like where this conversation is going,” said the home network architect, sidling out of the room.

One of our teen-agers noted sympathetically, “Dad’s a little obsessed.”

Given this nerd-alert scenario, I am understandably a big fan of our special feature this week: a seasonal favorite on cool stuff for gift-giving (page 80). Two of our intrepid staffers evaluated everything from MP3 paraphernalia, digital cameras and a “Happy Hacking Cradle” to an Australian claw-shaped gaming device and a mouse that vibrates and makes weird noises.

I’m sure something on those pages will find its way to Geek Central later this month.

“It’s a surprise,” I’ll tell him. “You’ll like it.”



PIMM FOX

New Rules for Consultants Will Add Work for IT

THE SECURITIES and Exchange Commission and the accounting industry have come up with new rules to address potential conflicts of interests at firms that audit the books of companies with which they also have IT consulting relationships.

The toughest restrictions on these auditing/consulting firms won't kick in for 18 months, but IT managers who use consultants from accounting firms should get ready for more paperwork and management requirements.

On the surface, the rules drive a wedge between the IT consultants and the auditors to ensure that accounting firms can keep their IT consulting contracts while preserving the impartiality of audits. The main reason is the big bucks consulting brings in: IT consulting and business strategy consulting were worth \$39.4 billion last year, according to Ted Kempf, a senior analyst at Dataquest. Of that, \$7.24 billion was generated by the Big Five firms.

There are several ways in which accounting firms can keep their IT consulting businesses. Most would require IT management at client firms to do the following:

- Acknowledge their responsibility for internal controls to their auditors, in effect indemnifying the consultants.

- Make the important IT project decisions and identify someone who has the authority to make all management decisions on a project.
- Evaluate a project's adequacy and results.
- Verify that management doesn't rely on the consulting firm's accounting work as the primary basis for determining the adequacy of the company's financial reporting system.

This additional reporting burden might cause some clients to sever ties with their IT consultants, says Mike Drizzen, executive vice president at Experio Solutions Corp., a Dallas consulting firm.

In anticipation of this potential problem, the Big Five have been separating their IT consulting arms. In February, for instance, Ernst & Young sold its IT consulting business to Cap Gemini for \$11 billion. PricewaterhouseCoopers tried unsuccessfully to sell its consulting operations to Hewlett-Packard for a reported \$18 billion.

As a result, IT executives will see new and more aggressive efforts by consultants — both big and small — to win business.



From left is Computerworld's West Coast bureau chief. Contact him at pimm.fox@computerworld.com.

THE ONLY BUSINESS JOURNAL ANALYSIS

DECEMBER 4, 2000



**Collaboration is the Path to
Raging Knowledge**

WILL
P

COMPUTERWORLD

COLLABORATION

PATH TO RAGING KNOWLEDGE

Companies implementing a knowledge management system are faced with the challenge of meeting their users' expectations, which have been molded over time. In order to provide a more personalized user experience — one that mimics touch, feel and the sense that customers are talking directly with someone — collaboration is the critical factor.

Effective collaboration means employees use the knowledge management system and become contributors to it to enhance the content and its value. The capture, analysis and incorporation of knowledge is the foundation of knowledge management. By using this input, organizations can create a customized user experience and improve profit, grow revenue, retain key talent and expertise and increase customer retention and satisfaction.

Collaborative Environments

Collaboration has a better chance of success in a Business-to-Business (B2B) or Business-to-Employee (B2E) knowledge management environment because end users have a higher vested interest in using the system since salaries, bonuses and other incentives can be tied to it. Collaboration is more difficult in a Business-to-Consumer (B2C) environment because end users don't have a vested interest since the incentive options are limited in the environment. Also, the likelihood of meeting the end user in person in a B2C environment is lower, which makes relationship development more difficult.

Business-to-Employee

A B2E environment focuses on a knowledge management solution as a performance-enhancing tool because the solution is internally focused. A business will be able to monitor and enhance performance because of face-to-face interaction with the employee, allowing targeted feedback and development of incentives and users have a vested interest in its success. The key concepts in a B2E environment are change management, collaboration and community development. Change management entails not only using the system but also actively contributing to it. When this behavior expands through the organization, the potential for collaboration is heightened and becomes realistic. Collaboration allows organizations to leverage a knowledge management system internally through the operational areas of the company and out to customers and partners. Community development is

the ultimate goal in a B2E environment. Once that is accomplished, the system should be the only one available to the employee. In order to achieve long-term success, it is critical that internal and external knowledge management systems are integrated into one system for real-time information flow.

Achieving user interaction is easier said than done. The business must have a sharing culture that will only begin when the employees understand the benefits of the knowledge management solution and the business problems that are going to be solved. Training and change management are key elements in a successful knowledge management solution.

Business-to-Business

A B2B environment differs from a B2E environment because the knowledge management solution moves from a purchasing focus to a productivity focus. In this environment, customer service becomes critical and the system needs to be integrated into any existing B2E solution to allow for effective information flow. Challenges in the environment include less face-to-face interaction than in a B2E environment and difficulty in training the user. Collaboration remains an important focus in the B2B environment but changes from internal to external collaboration. Community development remains a major focus along with content management in order to drive usage. The e-commerce focus introduces the ability to broker knowledge and market research data.

Interaction and feedback are critical for the success of a knowledge management solution in this environment. The focus can move away from change management and towards the importance of customer service management (CRM). In dealing with organizational processes, the e-commerce

functionality and customer-support functions also become critical. In addition, CRM technology becomes a larger focus along with the e-commerce requirements of the system. The market is seeing innovation in collaborative tools and IDC has identified three trends: messaging, ASPs and Instant Messaging.

Messaging

According to IDC, messaging, particularly e-mail, remains a high priority for most users. But meeting messaging requirements has been complicated by the high-level administration and system resources that collaboration/messaging solutions require.

When dealing with e-mail requirements, organizations question the status quo, which is dominated by a small number of groupware products. For the first time in years, organizations are exploring other options, including outsourced e-mail, fax and unified messaging services. An organization may stick with familiar collaborative software. However, some organizations will choose a different model for providing messaging to their users.

Organizations focusing on messaging will need to consider deploying a variety of messaging-related software and hosted services such as secure messaging, sophisticated content delivery, instant messaging and online-presence awareness. These initiatives may also focus on wireless device access to user mailboxes; inbound/outbound e-mail response systems as part of a larger customer relationship management, customer service and sales solution; and content filtering and management for capturing, organizing and archiving messages and attachments.

COMPUTERWORLD

This White Paper was created by Computerworld's Custom Publishing group. Comments on this supplement can be sent to managing editor Stefanie McCain at stefanie.mccain@computerworld.com. This White Paper, as well as other custom supplements, can be viewed online at www.computerworld.com.

which can be buried in the volume of messages received daily.

Messaging decisions are made independent of collaboration needs and some organizations opt for standalone messaging solutions. Suppliers of collaborative solutions without messaging will find greater market receptiveness among organizations looking for best-of-breed collaborative tools. Examples include team collaborative applications, group calendaring/scheduling, expert tracking and real-time conferencing software.

Application Service Providers

The willingness to outsource messaging and collaborative applications to ASPs will not be an all-or-nothing effort. Many companies that buy messaging and collaborative application services from ASPs start by outsourcing portions of their application infrastructure such as Internet-mail connectivity and dedicated server management. These initial outsourcing steps will be watched closely to evaluate the ASP's reliability, support, overall satisfaction and benefits relating to outsourcing before the organizations start thinking about what other applications and portions of the infrastructure will be outsourced.

Instant Messaging

According to IDC, business versions of instant messaging will pop up in workplaces for several reasons. First, key vendors are focusing on instant messaging. For example, Microsoft Corp. is adding instant messaging to its Exchange 2000 Server. Lotus Development Corp. will continue to push its Sametime product as an easy way to add real-time collaboration to

IBM's Lotus Domino/Exchange 2000 Server. Based at Apple, the two companies have announced a strategic partnership. Together, in this role, they plan to create a new, real-time, collaborative workplace, virtually meeting and working on key projects. For more information, visit <http://www.ibm.com/lotus/ibmexch2k.htm>.

Domino/Notes deployments. In addition, Novell Inc. will pursue its relationship with America Online Inc. to deliver instant messaging to its customers.

Another important feature of instant messaging is it allows workers to know when colleagues are available. This capability will be very valuable in team collaborative applications to identify team members who are currently available for consultation or collaboration. A third reason is the value in supporting and articulating policies for when instant messaging is appropriate compared to other types of communications. For example, a co-worker or team member wants to know, "Can I ask you a question?" or "Are you free for lunch?" Those questions do not require the formality of e-mail and can be better served through instant messaging. There is no reason to dedicate resources to index, store and archive such messages.

Collaborative Tools

Collaborative tools evolve around messaging and communication. Some of these tools include e-mail notification, shared calendars, message boards, learning/training platforms, real-time discussions, online surveys, chat, document sharing and expert tracking. While vendors such as IBM and Microsoft are in this playing field, many smaller companies are delivering innovative tools and solutions to enhance the collaborative environment. An interesting example of a company doing this is South Norwalk, Conn.-based Raging Knowledge. Raging Knowledge's

Tacit Knowledge

The personal, subjective and experiential knowledge that a person acquires in his or her lifetime.

products are based on proprietary technology that dynamically finds, creates, captures and manages tacit knowledge across a global enterprise. Tacit knowledge is the personal, subjective and experiential knowledge that a person acquires in his or her lifetime — "know how" in the popular lexicon.

Raging Knowledge predicates its products on two proprietary technologies. The first is a sophisticated profile-and-match technology. The second consists of a set of management tools that analyzes data gathered by the first technology. These tools allow corporate leaders to identify opportunities and liabilities that would otherwise be unapparent. The advantage of these technologies is that a company can now better understand its knowledge asset inventory and leverage that new understanding to support the development of business strategy and mission-critical decisions.

Raging Knowledge's solutions are designed for simple implementation, ease-of-use and rapid building of "people-centric" knowledge (rather than "document-centric" information). By focusing on these criteria, Raging Knowledge saves its customers time and money and increases the likelihood of a strong and quick ROI.

The company's products fall into two categories: corporate applications and online services. Raging Knowledge's corporate applications include Global Network and Virtual Service. Corporate applications are designed for internal identification and exchange of tacit knowledge and are ideal for global institutions and customer service organizations. The online services are aimed at small- to medium-sized organizations that need to augment their internal tacit knowledge inventory with external resources. Online services include branded and private-label offerings of ITInfoSource.com. Raging Knowledge focuses on user

functionality, but also on administrative functionality to identify knowledge request and inventory patterns. For example, an organization whose employees frequently submit inquiries regarding Oracle 9i or SAP R/3 may not be adequately inventoried in the appropriate expertise to sufficiently manage and maintain those mission-critical enterprise applications. Raging Knowledge immediately identifies such scenarios.

Global Network: Expertise Tracking

Global Network is a knowledge management application that allows an individual to identify and access internal expertise through a sophisticated, yet easy, inquiry and response system. The application allows organizations to:

- Share intellectual capital within a global company.
- Increase innovation and overall productivity.
- Shorten product development timetables.
- Accelerate complex problem resolution.
- Reduce the cost of and the reliance on outside professional services.
- Dynamically monitor employee participation and knowledge transfer.

The application is unique because it provides a multi-modal collaborative environment for knowledge transfer, a mechanism for capturing new knowledge created within the environment, and tools for developing and supporting strategic business decisions.

Virtual Service: Customer Support

Currently in development, Virtual Service is an execution of the Global Network product with specific

functionality to serve the CRM industry. Ultimately designed to increase customer loyalty and retention, it allows CRM organizations to reduce the internal escalation process associated with resolving customer service issues. For example, a customer service representative can identify and access expertise within the organization to quickly and efficiently resolve a customer inquiry without the multi-level escalation that exists in most CRM systems today. Virtual Service enables more expedient customer issue resolution, reduces cycle times, and drives down associated service costs. The solution captures and archives knowledge created through the expertise transfer, enabling even quicker resolution of the same issue the next time it occurs. Virtual Service enables a CRM organization to pool its collective knowledge from all sources — company employees, vendors, customers and field service personnel — to better respond to its customers.

ITInfoSource.com: External Expertise

ITInfoSource.com provides enterprise-level IT support to IT professionals through a Web-based collaborative platform. Supported by a global network of 2,000 technicians — collectively possessing expertise in over 4,200 areas of enterprise-level IT — subscribers to ITInfoSource.com have access to a robust inventory of tacit knowledge assets focused exclusively on IT. The solution enables subscribers to augment or even replace their internal support capabilities. Detailed enterprise-level inquiries are resolved with a guaranteed response time of two to 24 hours, depending on user-defined urgency parameters. Users can also participate in collaborative sessions with technicians. To maintain response quality and technician participation, ITInfoSource.com continuously manages the IT experts, systematically eliminating up to 20% of the technicians

and replacing them with new recruits. The enterprise-level support service is provided under the ITInfoSource.com brand name and through IT VARs via its private label offering.

Collaborative Industries

Raging Knowledge's services and applications solve business problems within many vertical industries. For example, in the food and beverage industry, large companies such as Nestle have international operations and can use collaborative and knowledge applications to determine new product characteristics, market research and best practices.

The computer industry can also benefit from collaboration. Expertise and collaboration are very important in help desk functions, best practices, marketing research, new product characteristics, product development and IT support.

Conclusion

Internal and external collaboration will increase with the growth of e-marketplaces, procurement and B2B e-business. For an organization's success in this environment, it must collaborate and create a user-friendly and effective solution. While collaboration will drive content value and usage, achieving this interaction is easier said than done. The business must have a sharing culture and employees must understand the benefits of a knowledge management solution and the business problems that can be solved.

Vendors such as Raging Knowledge are in an exciting and potentially lucrative market as they deliver innovative solutions that are easy to implement and operate, allow rapid knowledge base development, offer a much faster ROI and provide administrative functionality to address the challenges facing a company.

CASE STUDY:

Raging Knowledge enhances VAR value

John Kalleen III, CEO of ComputersAmerica Inc., takes his company's mission seriously. "Our job," he says, "is to understand our customers' business needs, and then ensure they are using technology in such a way to give them a competitive advantage."

ComputersAmerica has been providing technology to its Northern California clients for almost 30 years. But no matter how smoothly the wide area network or business-to-business e-commerce systems projects go, ComputersAmerica's clients still need fast, economic answers to technology questions, once installations are completed.

Which is why ComputersAmerica, a \$70 million systems integrator, offers its clients a new support solution made possible by Raging Knowledge, a leading innovator of tacit knowledge management. Through a private label version of Raging Knowledge's ITInfoSource.com, ComputersAmerica provides clients expert enterprise-level IT support.

"Though the systems are in production, customers still need ongoing support," he says, "such as 'I keep having problems with my Exchange Server . . . we're having downtime with our servers, does anybody have experience with this?'" By paying a fee to ComputersAmerica, customers can access "thousands of expert engineers who work with these issues all the time, through ComputersAmerica's site," says Kalleen.

Before ITInfoSource.com, there was no cost-effective way for customers to get access to quality support that spanned the multiple platforms most of them run.

"They could get support by individual manufacturer," says Kalleen, but that means paying multiple vendors. Then there's the question of whether any single vendor can solve what are typically multi-vendor problems.

"When you're pulling together [vendors like] Cisco, HP, IBM and Microsoft, and you're using multiple technologies for a business solution, all sorts of questions can come up," says Kalleen. "We didn't see an effective way for our clients to get answers" to such multi-platform questions on an ongoing basis. "The beauty of the ITInfoSource.com support solution is that it's multi-vendor. Through it, ComputersAmerica can support virtually any configuration of vendors," says Kalleen.

Kalleen charges a "nominal" price for the service — especially when compared to the cost of downtime of one system. "If you get one question answered" which keeps a vital business system running, he asks, "how many thousands would that save?"

"Customers are impressed with the answers they get, and the response time," he says, which ranges from two hours to the next business day.

Kalleen says he's been pleased with the ease of working with Raging Knowledge, particularly with the up-front work needed to customize ITInfoSource.com to "look and feel so it fits seamlessly into the ComputersAmerica Web site. It was relatively painless. They're quite responsive."

ComputersAmerica's support offering is still new, and even though fewer than 20 licenses have been sold, the up-front costs have been recouped. "But even beyond profits on the service itself," says Kalleen, "ComputersAmerica benefits by becoming a more valuable partner to its customers."

"We're always trying to provide greater value to our clients. We bring them solutions to improve their business processes, their productivity and their profitability. Providing our clients technical support enhances that value."

**"Customers are
impressed with the
answers they're getting,
and the response time."**

— John Kalleen, CEO
ComputersAmerica

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Driessen, a 15-year veteran consultant, says that 10 or 15 years ago, IT consulting was dominated by the big accounting firms. "Today, there are lots of IT consulting firms you can do business with besides the Big Five," he says.

IT managers could also face consultants who are now shareholders in the client companies with rights and expectations.

IT consultants who work for firms that also audit their clients' books have been barred from owning stock in their client companies and from owning shares in mutual funds that own stock in client companies. The new rules and new IT consultants make this issue moot.

Either way, this means more work for IT managers. Either you'll have to weigh more sales pitches from a wider pool of consultants or, if you're happy working with a Big Five firm that also audits your company's books, you'll have more paperwork. ■

CATHY HOTKA

Retailers Must Weigh Factors in B2B Exchanges

BUSINESS-TO-BUSINESS exchanges will revolutionize trading, perhaps commoditize consumer goods and therefore provide dramatic cost savings for their participants.

Or they'll tie the standards bodies up in knots, victimize smaller suppliers and take years to produce a payoff.

Which scenario is correct? Could both be? The retail supply chain might be the most promising vertical market for B2B exchanges. U.S. retailing is, after all, a \$3 trillion industry. And many of the world's largest retailers are putting together promising exchanges, among them the Worldwide Retail Exchange (with Target, Albertson's, Best Buy, Kmart, Walgreen's and J.C. Penney) and the Global NetExchange (with Sears, Carrefour, J. Sainsbury PLC, Kroger, MetroAG and Coles Myers). But as other retailers evaluate whether to join their brethren who have found

B2B exchanges, they'll probably take into consideration four things — what I call the Four S's — as they examine how those new marketplaces might benefit them:

■ **Standards.** Larger retailers and their partners in manufacturing already use garden-variety EDI document sets for electronic transactions. EDI

won't go away anytime soon. XML, the "glue-wire" that allows a wide-variety of computers to speak to one another, will be the language of the Web, but at least for now, it imposes its own challenges. Among them are defining its dialects and finding qualified XML-literate staff. The National Retail Federation's (NRF) conversations with retail IT staffs indicate that retailers are interested in implementing common architectures across the enterprise, encompassing the supply chain and stores. They'll want to use standards, but they won't be in place tomorrow afternoon.

■ **Staff skill sets.** The NRF says that in 1997, 98.3% of retailers had fewer than 100 stores, and less than 1% of retail companies had annual sales of more than \$25 million. Only a handful of these companies have staff who know XML. They'll have to hire consulting expertise to get to the next level — but which consultants can deliver? How reliable is their judgment? In other words, what must these consultants possess in order to bring that handful of retailers to the next level?

■ **Savings.** There's no question that next-generation technologies will save money. The issue for the medium-size and smaller retailer is the upfront expense required to get to the next stage. How long until they see a payoff?

■ **Sourcing.** Exchanges can easily facilitate the purchase of commodity items like store maintenance supplies or pencils. But sourcing of more complex goods like sneakers or pajamas, where vendors must be prequalified, the materials qualified and tested, and the manufacturing monitored, will be much more difficult to tackle. It might require a more rules-based private exchange between supply-chain partners rather than a public exchange organized by a consortium of buyers interested in driving down prices. And if exchanges don't reach beyond purchases of commodity goods, retailers could decide to deploy catalog aggregation software rather than invest in exchanges outside their enterprises. ■

Retail has always been a bottom-line-oriented industry. Efficiencies that can drive costs down and streamline processes always draw retailers' interest. Several large retailers can arguably attribute much of their success to relentless elimination of supply-chain inefficiencies. Founders of B2B exchanges believe their new marketplaces will save them significant time and money. Retailers who aren't participating will likely examine closely the Four S's and look for tools that will provide them with a fifth S — speed — to hurry the payoff and make the B2B processes simpler. ■

READERS' LETTERS

H-1B's Political Cost

THE H-1B program is starting to have a cost. Sen. Spencer Abraham (R-Mich.) was convincingly defeated in his run for a second term. While the local press downplayed the effect of his immigration and H-1B visa positions, when I asked voters why they supported his opponent, Democrat Debbie Stabenow, the two issues always at the top of the list were his immigration and Social Security positions.

Geoff Wauscher
Utica, Mich.

A Hactivist's View

HAVING ASSISTED with some of the information in it, I felt I should make some comments on Deborah Radcliff's article "Meet the 'Hactivist'" [Business, Oct. 30]. Radcliff writes that "sentencing for even criminal hacking in the past two years has been relatively light."

Perhaps, but the road to that sentencing is har-

rowing. The average reader knows little about the tribulations these individuals go through, including beatings, seizure of equipment that was either never returned or returned broken, and a lack of medical care.

My comment on a digital Kent State was taken out of context. I did not say the Internet itself is the next Kent State, but that the hactivist is the equivalent to the protesters there — a counter-culture that the established culture doesn't wish to deal with.

Finally, in response to Michael Mastel, who wrote in an Oct. 30 letter that the translation of the Hebrew yetzer ra is "evil inclination," I would like to correct this common misconception.

The yetzer ra is difficult to define, because there are many different ideas about it. It's not a desire to do evil in the way we normally think of it in Western society.

Rather, it's usually conceived as the selfish nature, the desire to satisfy personal needs with-

out regard for the moral consequences of fulfilling those desires.

People have the ability to choose which impulse to follow: the yetzer tov or the yetzer ra. That is the heart of the Jewish understanding of free will. We all have the ability to make our own choices, and we will all be held responsible for the choices we make. That is the message my name implies.

Yetzer Ra
New York

Beware Greasy Chads

AS ANYONE in computing who has gray hairs knows, counting votes by hand is more accurate than optical reading. Besides the various chad problems, there's another way of introducing error. Back in the 1960s, we installed a mainframe system that included an optical card reader. If any of the keypunch operators, programmers or computer operators weren't careful, the reader could make an error. The usual

cause of a misread was programmers greasing mayonnaise on the cards. A soiled card permitted light to pass through for a false positive read.

Joseph S. De Natale
The Clapper Group
Wellesley, Mass.

Be Accountable

THE ROOT of the problem with B2B anonymity is not trust; it's accountability ("Who Got You Trust?" Emerging Companies supplement, Nov. 13). If there are problems, where does the buck stop? It's no different than knowing who pays if I wreck my rental car. John Sasser
Acton, Mass.

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to James Eckle, Letters Editor, Computerworld, PO Box 9071, 500 Old Connecticut Path, Framingham, Mass. 01901. Fax: (508) 679-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.



Member center is vice president of IT for the National Retail Federation, a retailers' trade group in Washington. Contact her at whitfield@com.com.



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JOHN GANTZ

The Changing Rules of the Storage Game

STORAGE OUGHT to be one of those things that IT managers can deal with out of their back pockets. Need more? Just buy more disks.

Are there trusty rules of thumb for this? Not on your life. It's a complex equation that drives demand for data storage in enterprises, and all the old rules of thumb are changing.

I learned about this from a white paper, "Rules of Thumb in Data Engineering," written by Jim Gray and Prashant Shenoy of Microsoft and presented at last spring's IEEE International Conference on Data Engineering. (You can read the paper at <http://research.microsoft.com/~gray/>.)

Some key points:

- Because the growth of disk capacity is outpacing that of speed to access the disk, the system "cost" of access is rising. Data engineers are working on schemes where the disks

are accessed sequentially, like tape drives, rather than randomly to keep the cost of these "fetched" down.

- Tape drives are being relegated to use as data archives because it can take days to reload all the information in a multiterabyte tape drive. Automated tape libraries help, turning off-line storage into near-line storage, but disk drives are almost as economical. Many companies now keep an entire set of duplicate disk systems at remote locations as backups.

- RAM costs are falling faster than the costs of magnetic storage. A megabyte of RAM used to cost 10 times as much as a megabyte of disk RAM and 1,000 times as much as tape RAM. Now, 1MB of RAM costs only three times as much as 1MB of disk RAM and 10 times as much as tape RAM. So when in doubt, put it in RAM.

To net it out, processor speed improvements are outpacing main memory improvements, which are outpacing magnetic media access time improvements. More information on disk must be cached so that the information on the disk can be read sequentially, and the caches themselves must get bigger in order to keep memory full.

Put anything over a network, and the storage equation grows even more complex. The overhead of sending messages around wide-area networks is so much more than sending a message from a computer to a disk drive that, according to

Gray and Shenoy, it pays to cache any Web page that will ever be called up again.

There are four implications for IT professionals. One is that the performance of tomorrow's systems will be at least as dependent on the data transfer and caching software running on them as on the hardware itself. Second, the proliferation of caches in and around the network will stress current system management tools. Third, storage dynamics and optimal system design will vary from application to application with, say, scientific computing and Internet commerce representing two extremes. Fourth, no one but you will understand this.

Designing multiple, complex applications will be tough enough in the next few years. Deciding how to optimize performance by implementing storage management systems will add to the challenge. How much do you cache? Where do you locate proxy servers? Do you go with RAID 5 (efficient with space) or mirroring (efficient with access)? And so on.

This is the rocket science of IT systems management. It's not something others in your organization care to know about or are even capable of appreciating. But you should. ■

BILL LABERIS

Out of Welfare And Into IT: A 'Win-Win' in N.Y.

LESS THAN a year ago, Jaime Colon was part of a problem. The economic boom had passed him by, leaving him an unemployed 34-year-old living on welfare in Brooklyn with a wife and 11 children.

Today, Colon is part of the solution, earning \$50,000 per year as a systems engineer at a value-added reseller. He's anticipating a 10% raise once he passes a certification test for which he's been preparing. In a white-hot job market, Colon has been offered higher pay at competing companies.

"These guys treat me just great and pay me fairly," says Colon of his Long Island-based employer. "I feel an obligation to stay with this company. For my kids, I'm a better role model now. Sometimes I can't believe what happened."

What went into the making of Jaime Colon, systems administrator and loyal company employee? By his own admission, he had no marketable skills a year ago when he was doing odd jobs, mandated by New York City's welfare office. He had a high school equivalency diploma and was

pretty good in math, but he didn't have a dame's worth of IT experience.

Colon wanted what thousands of welfare recipients must want: a chance for a job and a career. Some people feel that the answer to the IT skills crunch is more H-1B visas. But that wouldn't do much for some Americans itching to get off welfare and into the mainstream.

Fortunately for Colon, John Foley had a problem that's shared by just about every company and organization across America today. As a manager of sales channel development at Sun Microsystems, Foley's resellers just can't find enough skilled IT workers. One look at the double-digit pay increases shown by *Computerworld's* annual salary survey (*Business*, Sept. 4) confirms that the skills crunch is as alive as ever, with little relief in sight.

The late Robert F. Kennedy said, "Some men see things as they are and ask, 'Why?' I dare to dream of things that never were and ask, 'Why not?'" Foley has a bit of that spirit in him. Acting on his own, he approached the welfare office and the mayor's office in New York with a proposal to provide 10 weeks of intensive IT training for a dozen welfare recipients.

Foley wasn't driven solely by altruism. His resellers needed skilled workers, particularly those inclined to embrace almost continuous training to accommodate today's dynamic nature of IT. Foley's plan was to train his students in Sun Solaris skills. But that's the beauty of capitalism. You can act totally in your own self-interest and end up helping others along the way.

Welfare officials told him: "Have at it!" But they predicted a 20% weekly attrition rate among his students and told Foley he'd be lucky to place a quarter of his graduates in jobs related to the training.

Colon was among the first group of trainees, selected from a larger group based on interviews and related experience — which was generally very sparse. Twenty percent dropout rate? Not with this group: 100% graduated. And of the 36 graduates who have gone through the training to date, 90% have been placed in IT jobs, with an average starting salary of \$46,000. And about 40% of them are women, mostly single mothers.

Foley wants to expand his experiment to other U.S. cities. He's not doing anything that any number of employer-starved managers couldn't do, other than having the guts to do it.

Meanwhile, on most workdays at around 6 p.m., instead of lounging in front of the television, Colon is heading home on the Long Island Railroad, usually talking on his cell phone to one of the several clients he helps service. "I never had a bank account and could never buy my kids school clothes," he says. "Now I do both. I'm going to earn more and get more training and take advantage of what's out there." ■

MORE THIS ISSUE

The e-commerce explosion is causing a critical shortage of application developers. Web developers and related programmers, which IT managers say will be focus of their hiring and training efforts in the coming year. *Computerworld's* 7th Annual Skills Survey starts on page 54.



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Bill Laberis is a consultant in Holliston, Mass., and former editor in chief of *Computerworld*. Contact him at bill@laberis.com.



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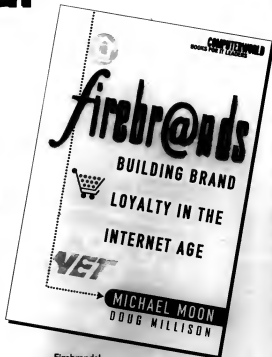
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—Andy Brownell, Director of Marketing, *Compaq Computer Corporation*



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BUSINESS

AUTO WEB

The Big Three automakers have joined together to create a common networking infrastructure for their dealer networks. It's a necessary step, say analysts, because most dealers work with a variety of manufacturers. **42**

ONLINE GROCERY SHOPPING

The stakes seem to be higher than ever for online grocers this holiday season. Some retailers, like Streamline.com and ShopLink.com, have announced plans to shut their virtual doors, while others, like GroceryWorks.com, are ringing up more sales than ever before. **42**

FAST DELIVERY

With more than 2 billion tons of cargo being shipped from U.S. ports annually, time and efficiency are critical. That figure is expected to triple by 2020, and demands will rise proportionally. So to remain competitive, a number of port authorities are turning to new e-commerce initiatives to speed the flow of cargo and better serve their customers. **44**

A NEW FORUM

Online retailers don't seem to be pouring more money into their TV and print advertising budgets this season. Instead, many are turning to online advertising, according to a recent survey by a retailers' association. **44**

CHEERS

The IT staff at Guinness Bass Import has been keeping busy with a new SAP system, says the company's CIO, Lynda Gurman. But there's also time to hang out at the private Irish pub in the building, where IT folks gather each Thursday evening for a pint or two of stout. **48**

CEO WISH LIST

What do CEOs want from their IT leaders? Sure, leadership, business and technology skills are all on the list. We asked the CEOs of Owens & Minor, Eastman Chemical, Ryerson Tull and GlobalNet-Xchange what else they really look for in their top IT executives. **48**

CAREER COACH

Executive coaches are becoming popular as motivators, sounding boards and friends for IT executives, who know that it can be mighty lonely at the top. **52**

MANUFACTURING DATA 2000

New technology being used by manufacturing firms to store and analyze data is helping them move more toward Web-based buying and selling, configured-to-order products, global outsourcing and better operational efficiencies. **60**

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THE SKILLS THAT THRILL

IF YOU'VE BEEN RAMPING UP on your e-business skills, well, you're in luck. According to *Computerworld's* 7th Annual Technology Skills Survey, that's exactly what IT managers are looking for. The real challenge lies with the managers, who find themselves competing — often with little success — for the few people who have what they're looking for.

54

Big Three Automakers Reach Pact on Dealer Networks

BY LEE EDELBAUM

Setting Motor City rivalries aside, DaimlerChrysler AG, Ford Motor Co. and General Motors Corp. reached an agreement earlier this month to establish a common network infrastructure for their dealer networks.

The Big Three automakers anticipate that most of their ap-

plications, such as those used to manage services to customers and track vehicle inventories, will migrate to the Web within the next three years.

Agreeing to a network infrastructure standard apposes multibranch dealers that sell vehicles from several automakers, analysts noted.

"It's what they had to do," said Jonathan Gaw, an analyst at IDC in Framingham, Mass. "Most dealers work with multiple manufacturers and nobody wanted to support more than one system. The Big Three coming together will go a long way to developing an instrument for the dealers and manufacturers to communicate more efficiently."

The network infrastructure

guideline includes specifics, such as browser types, network equipment and connectivity requirements, that are up to dealers to implement, said officials from DaimlerChrysler in Stuttgart, Germany.

Jim Vost, CIO at Dearborn, Mich.-based Ford, said the technical guidelines would benefit dealers by providing a

road map for building Internet-ready dealerships. "We are using technology to drive the business," he said. "The business is looking for every opportunity to improve performance and to be more responsive to customers."

FORD'S JIM VOST: "We are using technology to drive the business."

The push is part of an overall thrust to enable build-to-order systems that let customers configure and select vehicles direct from the automaker's production lines or inventory.

But thus far, experiments with Web-based ordering systems have had less than stellar results. Earlier this month, Detroit, Mich.-based GM launched a pilot test of a Web-based ordering system designed to let people in the Minneapolis-St. Paul area configure and order Oldsmobile

Aeron direct from the company. The system cuts the order-processing time from about 60 days to 15 or 20 days.

Guaranteed Prices

Customers may explore GM's main inventory at www.gmbuypower.com and are guaranteed a price online that falls below the manufacturer's suggested retail price (MSRP). GM officials said fewer than 10 customers have bought a vehicle through the pilot program,

which launched in September.

Ford launched a similar pilot in Ottawa last August [Business, Aug. 21]. Called Buyer-Connection, the system allows consumers to configure vehicles online and buy from one of the two-dozen local dealers in the pilot. The program uses what Ford calls an "e-price," which is lower than the MSRP.

Once customers decide to buy, the system gives them contact information for the local dealers that are participat-

ing in the e-price program.

The pilot program includes only 24 of the 565 dealers in Canada and offers pricing on just three vehicle lines. Sales via the system have been minimal, Ford officials said.

Creating a common Web-based network infrastructure "is barely a step in tackling the marathon of difficulties of creating a build-to-order system," said Gaw. Build-to-order is a long way off, because it involves redesigning factory systems and supplier fulfillment processes, he said, but Web communications with the dealers is an important start. ■

Grocers Brace for Holidays

BY MARC L. BOWEN

Some online grocers are ringing up big sales as the holiday season hits, but others are trying to dispose of their assets in going-out-of-business sales.

These divergent business results illustrate that the road to profitability in such a low-margin business is likely to be fraught with failures. For example, Streamline.com Inc. and ShopLink.com Inc. rival online grocery stores that were both based in Westwood, Mass., both announced plans to shut down late last month.

The key to success is clamping down on delivery and ful-

fillment costs, said Janet Suleski, an analyst at AMR Research Inc. in Boston. But many are struggling to do just that. For example, she said, New York-based delivery service Kozmo.com Inc. recently spent \$26 million to fulfill orders for \$3 million worth of groceries.

But some online grocers remain upbeat about holiday demand. Webvan Group Inc. in Foster City, Calif., did so well on Thanksgiving that it had a run on preordered turkeys in the San Francisco area.

But Ravi Kalakota, an analyst at e-Business Strategies in Atlanta, said Webvan and other

online grocers won't be able to succeed because they can't integrate goods from different suppliers and ship them in a cost-efficient way.

Some online grocers benefit from affiliations with established brick-and-mortar retailers. Suleski said HomeRun.com Inc. in Burlington, Mass., is faring well partly because of its relationship with its parent, Hamaford Bros. Co. in Portland, Maine. She added that U.K.-based grocer Tesco PLC is also doing well with its Tesco.com venture.

Sales up, But no Profits

HomeRun.com's sales are up by double-digit margins compared with last year, said Allison Berglund, vice president of marketing and business development at the retailer. But the five-year-old company has yet to turn a profit, she added.

Another example of bricks-and-clicks collaboration is Dallas-based GroceryWorks.com Inc., which sold more turkeys and pumpkin pies during Thanksgiving than it did during the rest of the year combined, according to president and founder Kelly Hagar.

So far, Hagar said, there haven't been any inventory shortages or product outages, thanks largely to the experience of GroceryWorks.com's brick-and-mortar partner, Safeway Inc. in Pleasanton, Calif. Knowing what products to order and how much to have on hand at GroceryWorks' facilities, "is one of the real benefits of our relationship with Safeway," he said. ■

Julia King contributed to this article.

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E-Commerce Speeds Business at U.S. Ports

Technology improves cargo flow, provides real-time information to customers

BY LINDA ROSENBERG

US. PORTS and waterways handle more than 2 billion tons of domestic and import/export cargo annually, a figure that's expected to triple by 2020, according to the American Association of Port Authorities in Alexandria, Va.

To remain competitive and handle the increase in cargo shipped by water, U.S. ports are using logistics software and the Web to run their businesses more efficiently and meet customers' needs.

"[Shipping companies] want to be able to track and trace their cargo, book freight and check on the availability of cargo and equipment through one Web site in a real-time manner," said Steve Hennessey, director of terminal operations at CSX Lines LLC in Charlotte, N.C., which provides ocean transportation and logistics services.

Chris Newton, an analyst at AMR Research Inc. in Boston, said he agreed that the main thing a port's customers want is the ability to keep a close eye on their goods.

"They don't want to lose sight of their cargo, so it's good for the ports if they have the ability to track the movement of shipments," Newton said.

Advanced Freight Technologies

But how exactly can ports meet their customers' needs?

Through advanced freight technologies, according to the John A. Volpe National Transportation Systems Center in Cambridge, Mass.

For example, next month, the Port of Charleston in South Carolina will roll out a computerized Yard Management System designed to rapidly move cargo in and out of terminals by improving container organization, said Pam Everitt,

IT director at the South Carolina State Ports Authority in Charleston, which operates three public seaport facilities including Charleston, the fourth-busiest container port in the country.

A container is a rectangular box used to ship goods on ships, trucks or railroad cars.

"As volume increases, we have to be more efficient moving cargo," Everitt said.

Everitt said the new system will be capable of tracking containers and instantly reporting their status electronically. She declined to divulge the system's cost. Compared with the port's present paper-driven terminal process, the new electronic system will provide a more accurate perspective of where containers are in the terminals, according to Everitt.

Knowing the location of containers will let workers in the container yards direct truck drivers to an exact location, rather than a "ballpark" estimate of the location, to pick up a particular container, saving time and money for the customer, he said.

Other U.S. ports also understand the need to run efficient transportation operations and are implementing new systems to reach that goal.

The Port Authority of New York and New Jersey in New York is setting up a new Web site designed to offer transportation providers, exporters, importers, terminal operators, freight forwarders and others one-stop shopping for the data they need to make decisions about cargo pickup and delivery, said Rick Larabee, director of port commerce.

The new platform, called FIRST (Freight Information in Real-time System for Transport) is slated to be launched next year.

By logging on to www.firstny.com, all parties will be able to access real-time information on ship arrivals, the status of arriving cargo and highway traffic in the vicinity of the New York/New Jersey ports.

For example, by first verifying that a container has arrived at a port and has been released



A NEW SYSTEM at the Port of Charleston in South Carolina will help move cargo in and out faster.

for pickup, a truck driver can avoid an unnecessary trip to the port.

Manuel Garrimela, director of operations and planning at CSX World Terminals LLC, also in Charlotte, said shipping companies are just now asking for these services from terminal operators. He said it may be because until recently, shipping lines weren't sophisticated enough technologically to take advantage of such Web-based offerings.

Yard Work

Jim Eldridge, director of administration at the Port of Houston Authority, said the authority is implementing new computer systems from Navis LLC in Oakland, Calif., to help manage its container terminals. "This is just [one place] where we can help our customers [save time and money] by being more efficient," Eldridge said.

Together, the Navis SPARCS and Express systems will allow automatic yard planning to determine the best location to put a container as well as provide information including container availability to the port's customers. In addition, Eldridge said, computerizing the yard-management functions will allow trucks picking up containers to get in and out of the yard faster.

On the West Coast, the Port of Seattle, like other U.S. ports, is computerizing its container terminals to move freight faster and more efficiently, according to Mic Dinsmore, the port's executive director.

For example, truckers can use the port's container tracking Web site run by Long Beach, Calif.-based eModicom LLC to help cut down on wasted trips by checking if a specific container is ready to be picked up.

Dinsmore added that the port is launching a five-year, \$20 million e-business strategy that will ultimately move all of its internal and external business processes to the Web.

"Our customers" will have easy access via our Web page to do business with us," Dinsmore said. ■

Online Retailers Continue Shift Toward Web Marketing

BY DAN VERTON

With the holiday buying season heating up, a large number of online retailers have shifted their marketing focus away from television and print ads in favor of targeted online marketing programs and are taking greater steps to keep their customers happy, according to a survey released last week.

Shop.org, a Silver Spring, Md.-based trade association of online retailers, and The Boston Consulting Group (BCG) published the study, the latest in a series of quarterly surveys they have conducted to track e-commerce companies. The third-quarter findings are based on responses from 94 online retailers, according to Shop.org.

Survey respondents said they spent an average of 64% of their marketing budgets on

online media campaigns like targeted e-mail advertisements during the third quarter — up from 59% during this year's second quarter. Only 4% of the third-quarter respondents said they had increased their spending on TV advertising.

Meanwhile, 54% of the retailers who took part in the latest survey said they plan to offer electronic and paper gift certificates, and 65% said they have increased their order-fulfillment capabilities to avoid shipment bottlenecks.

The average cost of attracting each new customer also dropped, from \$40 in the second quarter to \$20 in the latest three-month period, thanks to what James Vogtle, director of e-commerce research at Boston-based BCG, described as more efficient spending on marketing.


"You will not see the same rash of television ads that you did last holiday season," he said. "Online marketing is by far the preferred medium."

Online retailers that participated in both the second- and third-quarter surveys reported a 28% average increase in new customers, despite a 3% decrease in customer-acquisition spending.

Elsine Ruben, chairwoman of Shop.org, said the number of online retailers teaming up to drive traffic to each other's Web sites through cross-promotion deals is also increasing as online cross-marketing techniques prove effective.

Despite the increased focus on targeted online marketing, subtle differences remain between multichannel retailers and pure-play e-commerce companies. Vogtle said. Companies with both physical retail stores and Web sites "were more likely to invest in back-office infrastructure," he said. "The pure-plays are more likely to be expanding into [different] product categories." ■

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What It's Like to Work at ...
Guinness Bass Import

Interviewer: Lynda Gutman,

CIO

Company: Guinness Bass

Import Co., a division of Guinness/UDV (United Distillers and Vintners), which is owned by food and drink conglomerate Diageo PLC.

Main location: Stamford, Conn., parent company is based in London

Number of IT employees: 12 in the division, plus 10 consultants, 1,000 in Guinness/UDV worldwide

Number of employees (and users): 300 in the division

What are the most important systems at a beverage importer? [Enterprise resource planning] and systems that enable us to understand what's happening in the marketplace - what's being sold where, how we're doing in the public as well as the off-trade [retail stores]. We have a three-tier distribution system in the U.S. Our customer is actually the distributor, but what we need is the information on who they are selling to and how much. ... We're starting to look at data mining and data warehousing. We have a data warehouse, but it needs to be revamped.

Major IT initiatives: "We've just completed an SAP design for finance, order-to-cash, procurement and logistics. The SAP design is all Web-enabled. It will allow customers to enter orders and see order status. But it's not yet implemented - that will be the big project next year. We're also gathering the deployment information for our data warehouse. We're looking at the timeliness of [the data] and so forth, as well as trying to get it by account as well as by customer."

Do the holidays put any additional pressure on IT? "No, our huge selling season at Guinness Bass really starts in January for St. Patrick's Day UDV [which sells Guinness], Johnnie Walker, Jose Cuervo and other brands of distilled spirits and wines] has its own IT, and they might feel a bigger impact."

IT training for next year: SAP AG software training, and each IT staff member will have

an individual training plan

Employee reviews: Annual performance reviews are conducted by managers

Career-path options: "We are part of such a large company that while career paths aren't defined, there are opportunities at UDV, Guinness or other Diageo companies. There are people who move across the water or go back and forth."

Workday: "It's relatively flexible as long as you're here during our core hours. Usually people arrive between 8:15 and 9 a.m. and leave between 5:30 and 6 p.m. We also have summer hours - we leave early on Fridays."

Really? "It's a very stable working. Balance of work and life is very important to the culture here, so we make sure in project planning that we'll have that balance. Sometimes we have to be here on the weekend if a server goes down, for example, but the hours are fairly stable."

Kind of offices: "They were redesigned last year. ... It's very avant-garde, with cool, curved walls and sitting tables to create impromptu meeting spaces."

What do you see on people's desks? "There's a clean-desk policy, so [only] family photos and company marketing materials."

Must people carry beepers? Cell phones? "Most of the tech staff have cell phones, but there are not a lot of after-hour calls."

On-site sports club? "There's a health club across the way where we can get discounted memberships."

Free beer in the fridge? "There's not beer in the fridge, but there is a private bar/pub on the north floor that's open to all employees on Thursday nights. You can get an excellent cup of Guinness."

The one thing everyone complains about: "The expectation that we can turn everything around in one day."

Last company-wide/department-wide party: A company meeting in July at The Sagamore in Lake George, N.Y.

Lynda Gutman

(lgutman@netcom.com)

PAUL A. STRASSMANN

Fishing for Data

KNOWING SOMETHING about fishing helps to understand what you get when you click on AltaVista, Google, Ask Jeeves or any other popular search engine. First, you never search directly for what's on the Web. Of the estimated 550 billion documents floating in

cyberspace, you get a chance to explore only about 1 billion. You "fish" in compartments that each search engine has set up, making it possible to easily retrieve your "catch" in seconds.

What you can find each time you cast your line is limited by the extraction and retention techniques that give you simplicity over thoroughness, meaning any findings will be superficial. What you get is what has already been found by a search engine "spider," such as pages logically linked to other pages. If others haven't shown interest in the documents you're looking for, the chances of those pages showing up in a search aren't good. The authors' eagerness to be noticed has led to tricks for tuning Web pages to exploit the idiosyncrasies of proprietary search methods. For example, I get offers every week to dress up my own Web pages so that some searches will favor my content over that of my competitors.

Second, you'll never find out how complete or reliable a search engine's findings are. The boasts about unique "crawling" methods are only promises, because proof is always missing. Vendor-specific Web-exploring software decides what's revealed and what remains hidden. In rare instances, a search engine will locate only the catch that's further enhanced by an editorial staff that sorts and classifies the subject matter. For instance, one of the most frequently visited Web sites, Yahoo, offers more than 1,000 indexes who place Web content in predefined categories.

Third, existing search engines work off the flawed assumption that everything must be searchable in one pass. Consequently, you're encouraged to inquire by using only a few keywords. In some of the more sophisticated searches, a two- to four-word phrase is also allowed. Occasionally, you're offered "advanced" options where you can call for some elementary logic that would sort what to include from what to exclude. Unfortunately, this doesn't work well in cases where the choice of a popular term, such as "Web," yields more than 30

million results, in no particular order. The existing search engines don't let you play a game of 20 questions, which would make it possible for an inquirer to interact sequentially with databases. In that game, when an ambiguous question is asked, it usually takes a few tries before the query's correct meaning is understood. Then, it may take repeated give-and-take before you get a meaningful response. No current search engine engages in anything that would look like an intelligent exploration of what's being sought.

The Web represents the most awesome accumulation of data ever. But converting it into knowledge capital requires better retrieval methods. The shallow techniques of commercial search engines may satisfy casual employee inquiries, most journalists and certainly all

politicians, but they won't serve the needs of comprehensive commercial intelligence. As these engines are deployed as elements of corporate business intelligence, their simplistic inadequacies become dangerous because they may not find information on certain critical events that can make a difference in one's research.

Existing search engines don't let you play 20 questions.



deploying superior information intelligence will be a decisive weapon in tomorrow's world of business competition. ■

Strassmann (paul@strassmann.com) believes information competition is the extension of economic competition that has been pursued by material means.

● Day

What do chief executives really want from their CIOs and IT organizations? The usual must-haves, but also wise and trusted advisers to help steer them through uncharted e-business waters. By Julia King and Minda Zetlin

O, WHAT DO CEOs REALLY WANT from their top IT executives and organizations? We posed this question to chief executives at four very different kinds of companies and received surprisingly similar responses. Leadership, business and technology skills are all must-haves. But what the chief really wants in a CIO is a wise and trusted adviser to help separate fact from fantasy in the tumultuous world of electronic business.

business and technology skills are all must-haves. But what the chief really wants in a CIO is a wise and trusted adviser to help separate fact from fantasy in the tumultuous world of electronic business.

GIL MINOR

Age: 60

Company: Owens & Minor Inc., Glen Allen, Va.

Type of business: Medical products distributor

Annual sales: \$3.2 billion

"It so happens we're searching for a CIO right now, so this subject is pretty high on my priority list," says Minor when asked what he would look for in a CIO.

A high degree of technical sophistication and an understanding of how technology products interconnect are both essential, he says. But any candidate good enough to make it to the interview stage of the hiring process is assumed to have these qualifications.

More important, Minor is looking for someone who can effectively build a bridge between the company's business strategy and its customers' needs.

"Our strategy is to provide a supply-chain solution to our customers that helps them reduce their costs by using our technology platform," he explains.

"We're developing information tools to make that happen. We're heavily engaged with using EDI, using e-commerce and everything else. We're very technology-driven.

"Our senior management table includes five or six people, and I want



GIL MINOR, 60, is a Managing Director at Owens & Minor Inc., a medical products distributor. He is also a CIO and a member of the board of directors.

What C

our CIO to be one of those people. I don't think [IT] is any less important than sales or finance."

In particular, Minor says, he's looking for a CIO who can clearly communicate complex technological information in terms that make sense to businesspeople, both inside and outside the company. "Probably more important than anything else is being able to take the technology strategy and talk about it to our customers, to our suppliers — and Wall Street," he says.

While the CIO wouldn't be expected to make a presentation to a group of financial analysts, Minor says he will call on his new CIO to sit in on conference calls or one-on-one calls with analysts.

"If you can reduce it from a technical story to one people can understand, you get a lot of credibility," Minor says. "I think it's a great benefit if we have someone in our organization who can do that."

EARNEST W. DEVENPORT JR.

Age: 52
Company: Eastman Chemical Co., Kingsport, Tenn.

Type of business: Producer of specialty chemicals, plastics and fibers
Annual sales: \$4.59 billion

"The bottom line is we're looking to them to add value to the business models and thus add value to the company," says Devenport.



"More specifically, I'd say the CIO clearly has to understand the business. I think it's difficult to take someone who is just a technology person and make

them a successful CIO," he explains. "That happens in many companies, but I think it happens over time because the CIO stays with the company and works in IT long enough to understand the business. They must have the business knowledge to understand how information technology can evolve the business from a strategic point of view."

"I'm looking to our CIO to really

lead the effort in e-business. I'm looking to [CIO] Roger [Mowen] and Fred [Buehler, director of electronic business] to really help me move the company as rapidly as we can into the e-business world. We're on the bleeding edge right now in terms of the chemical industry and I think we want to stay there," Devenport continues.

"I look to Roger to provide the leadership internally and externally and to help me stay abreast of what is happening in the e-world. It is a different world and one that, unless I really get involved, I would not understand. The way I manage the company is through the executive team, and Roger sits on my executive team. Roger plays a key role in keeping me involved in the e-world in terms of how to stay out front and which business models are successful," he adds.

"You also need someone who has the respect of others in the organization and someone who networks extremely well so they can help the CEO recognize the need for change in terms of the e-world and IT and have all the other business managers understand the need for change and create that buy-in," says Devenport. "The CIO also has to be a person with a really long-range focus, because when you talk about putting in systems enterprise-wide, you clearly can't do it in one or two years or expect the payoff to be immediate. You have to have someone with more of a strategic view."

NEIL S. NOVICH

Age: 46
Company: Ryerson Tull Inc., Chicago
Type of business: Metals distributor and processor
Annual sales: \$2.8 billion

What was Ryerson Tull looking for when it appointed Darrell Zerke its current CIO? "Understanding of the business world and business issues," Novich explains. "The CIO does not have to be an expert in every aspect but must understand the basic guts of the business."

For instance, Novich says, part of understanding Ryerson



understanding Ryerson

Tull's business is knowing when people in the field need software with flexibility built in. "We have a system that computes the projected profitability of any contract, and that system is very flexible. If you can't get the price you want, but you can get better terms than usual, it can make those calculations," Novich says.

The most effective way for an IT organization to meet the needs of the business units it supports is to have IT staffers and their business constituents "meet in the middle," he says. "It requires everybody to have one foot in the other person's camp. And it can't be one-sided. You can't say, 'I'm looking for the perfect CIO; without also training my staff to work with IT.'"

A good CIO can help with this training, Novich adds. Every month, the dozen or so executives who head Ryerson Tull's business units meet for a high-level discussion, and Zerke is always present at these meetings. "He can provide information, and he can also say, 'Let me teach you a little about what IT is about. And here's a new type of application — does anyone think it's useful for us?'" Novich says.

A good CIO can help keep the entire organization excited about IT by implementing new technology regularly, Novich adds. So, while the IT group works on an important long-term project such as Ryerson Tull's new e-commerce system, Novich says he encourages it to also complete small projects that can help with users' day-to-day frustrations.

"It seems like people are doing a lot of X out there in the field, so you design a system for reporting X," he says. "That's less important than an e-commerce project, but people can see that there's good stuff coming from systems all the time."

JOSEPH E. LAUGHLIN

Age: 36

Company: GlobalNetExchange, Belmont, Calif.

Type of business: Internet-based marketplace for retailers and manufacturers

Annual sales: Unavailable (private company)

"We don't have a chief information officer. We have a chief technology officer. In our business, it's all about technology. It's about leveraging the Internet and exchange-enabled technologies to provide value to trading partners, which are retailers and manufacturers," Laughlin says.

"I need the CTO and the IT organization to really think out of the box as



to how we can apply technology to solve real business problems and issues today. I'd like our IT organization to be the best applicator of not necessarily the

latest and greatest technology, but proven technology. We have to be willing to experiment, but we have to provide real solutions that really work," he adds.

"We're a service business, so the IT organization has to deliver an operating environment that is absolutely, positively secure, available and fast."

IT also has to be involved in the creation of strategy, because our whole business is built on leveraging the Internet to drive inefficiencies out of the retail supply chain," Laughlin says.

"When we want to come up with a new product or service, it's primarily built upon technology."

"We're trying to take manual processes and older processes, like electronic data interchange, and replace them with faster and more robust technologies. Our whole job is to provide buyers and sellers with access to information which previously didn't exist and to provide collaboration between partners. IT is critical to everything we do every day," he says. ■

King is Computerworld's national correspondent. Zerlin is a freelance writer in Woodstock, N.Y. Contact her at Minda@minda.zerlin.com.

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Someone to Watch Over Me

It's lonely at the top. That's why more and more IT executives are hiring coaches to act as their sounding boards, motivators, friends and mentors. By Jill Vitiello



"MY FOCUS IS helping IT executives add value to the business through technology and leadership skills," says executive coach Susan Cramm.

THERE ARE FOUR PRIMARY reasons why people use executive coaches, according to a survey conducted by the Washington-based International Coach Federation — for advice, inspiration, friendship and a guardian angel.

"An executive coach is like having a personal fitness trainer working for your career advancement and improvement," says Laura Berman Fortgang, president of LBF InterCoach Inc. in Montclair, N.J., and author of *Take Yourself to the Top: The Secrets of America's #1 Career Coach* (Warner Books Inc., 1998).

For the most part, IT leaders want coaches with a proven track record in their profession to provide practical, actionable advice.

Actionable Advice

Tom Rosch decided to use a coach after undergoing a 360-review process by his staff, peers and management. "I found that my perceived strengths were not necessarily my true strengths," says the vice president of IT in charge of worldwide film distribution at Los Angeles-based 20th Century Fox.

Rosch hired Susan Cramm, president of Laguna, Calif.-based Value-

dance, a coaching firm for IT executives. After four years at the company, Rosch had transitioned to a new position in which his peers also reported to him.

"Susan helped me build relationships with my peers, and pretty soon a tough situation began going much more smoothly," says Rosch.

Cramm, a former CIO at Irvine, Calif.-based Taco Bell Corp. and chief financial officer at a division of Purchase, N.Y.-based PepsiCo Inc., began coaching IT executives after she made her own life-changing choice.

"At the end of 1997, I learned my mother was terminally ill. I resigned my CFO position to spend time with her," Cramm recalls.

She began coaching when she met Justin Yaros, who had just taken a job as vice president and CIO at 20th Century Fox.

"I first heard about executive coaching at a conference when I learned that top IT leaders used executive coaching religiously," says Yaros, now CIO at Sony Picture Corp. in Los Angeles. "I was a new CIO at the time, and I knew I needed some help in defining my role in the organization."

Choosing a Coach

A mutual friend matched Yaros and Cramm in 1997. They have since worked together, on and off. Cramm assisted Yaros in creating the mission and core values for the Fox IT organization, a leadership development program and a personal career plan.

"It's impossible to know to what degree executive coaching attributed to it, but after only nine months on the job, I was promoted from vice president and CIO to senior vice president and CIO," says Yaros. "That kind of speedy promotion is rare."

Ultimately, the coaching experience paid off for the entire IT organization, Yaros says.

Yaros discussed with Cramm his ideas for decentralizing the department, which provided increased opportunities for high-potential employees. Cramm then helped him create the process for validating, planning and selling the change to management.

"I had nobody else with whom I could discuss my idea and its implications," says Yaros. "I couldn't ask my subordinates for an objective opinion, because the decision would affect them. I couldn't discuss it with my boss until I thought through the implications. Working with a coach allowed me to take the germ of an idea and grow it in a safe form."

Another idea he developed became a project with Fox's human resources department to create the Emerging Leaders Program. It's based on coaching principles he learned with Cramm. "I use a mentoring model," says

Cramm. "I consider myself a practitioner, and my focus is helping IT executives add value to the business through technology and leadership skills."

"Make sure your coach is contributing to your current job performance," Cramm advises.

At the beginning of each assignment, she gives her clients a statement that outlines the specific objectives they will work toward. The work statement also provides a tool for measuring the success of the coaching experience.

"Susan and I decided on a set of traits that I had to work on as an executive, and she has given me a road map on how to be successful," says Rosch.

"Look for rapport," says Fortgang. "Look for instant comfort level. This has to be someone you will think forward to speaking with on a regular basis." ▶

Vitiello is a freelance writer in East Brunswick, N.J.

Executive Coaching Basics

■ **How much do executive coaches cost?** Coaches charge by the hour, by the month or by the project. Expect to pay the equivalent of a management consultant's fee. Rates run \$150 to \$375 per hour.

■ **How long does a coaching relationship last?** Most coaches ask for a commitment of six months.

■ **How is the coaching delivered?** In general, most executive coaching is delivered over the telephone in half-hour or hour-long conversations several times a month. COs, however, seem to prefer face-to-face consultations of about an hour and a half once or twice per month.

■ **Where can I find a qualified coach?** Most people meet their coaches through personal referrals. The International Coach Federation (ICF) sponsors a referral service. Visit its Web site at www.coachfederation.org or call (888) 236-2622.

■ **What kind of people hire coaches?** Most are professional people whose average age is 41 and who have college or advanced degrees.

■ **What are the results of working with a coach?** According to the ICF, clients report the following outcomes as a result of working with a coach:

■ Self-awareness	67.6%
■ Setting better goals	62.4%
■ More balanced life	60.9%
■ Lower stress levels	57.6%

**Frankenstein,
Count Dracula,
The Creature from the Black Lagoon**

**Would you do business
with any of these monsters?**

HireAbility.com provides a not so frightening, customized alternative to the overwhelming, hard to manage recruitment sites on the Internet today. Whether you're looking for the perfect job or the perfect candidate, HireAbility.com focuses on making the perfect match between IT professionals and the clients that need their skills. Instead of trying to be everything to everybody we focus on what we do best and that's IT!

At HireAbility.com we pride ourselves on our commitment to quality service and customer relations. We're building communities for IT and recruiting professionals, and hiring managers to share information and tap into valuable resources and services. We offer specialized profiles and enhanced searching capabilities, which won't leave you fighting off a variety of unlikely prospects. Also, HireAbility.com's intuitive user-friendly design, contact lists and group e-mailing capabilities greatly improve efficiency.



COMPUTERWORLD'S

7th annual

7 SKILLS SURVEY

The e-commerce explosion is causing a critical shortage of application developers, Web developers and object programmers, which IT managers say will be the focus of their hiring and training efforts in the coming year. By Leslie Goff

AFTER SEARCHING three months for a Visual Basic (VB) developer, Paul Coyle, chief technology officer at The CCS Cos. in Newton, Mass., thought he'd finally hit pay dirt.

The candidate matched all of Coyle's criteria: he had three years' real experience with VB, a college degree (from Hanover, N.H.-based Dartmouth College) and experience with report writers, which was a big plus because Coyle has a significant data warehouse project coming up.

Coyle interviewed the candidate late on a Tuesday afternoon in October and made his move early the next morning. He called to offer the job at a salary that was \$5,000 more than the candidate had requested.

But another company had beaten Coyle to the punch, extending an even

higher offer earlier the same morning. CCS's position, which opened in June, was still unfilled at the end of October.

"We chose Visual Basic as our development tool because it's relatively easy to learn, and we hoped that by going with it vs. C++ or another language, we would be able to find the talent we need," Coyle says. "But anyone who has Visual Basic [experience] has their pick of positions."

Coyle's difficulty in filling the VB position illustrates the extent to which application development skills will drive IT recruitment and training next year. In fact, according to Computerworld's 7th Annual Technology Skills Survey, which was conducted in the past three months, 70% of the 307 IT managers responding report that next year they'll hire or train staff in programming languages, Web development tools and object-oriented tools.

E-business initiatives such as sup-

plier-facing extranets, customer-facing Web-based applications and collaboration on industry exchanges and marketplaces top IT agendas for next year. Hand in hand with those efforts are the related pieces of supply-chain management and customer relationship management (CRM) systems such as data warehouses and knowledge management applications (see story below).

To get the job done, companies are either building applications from scratch or hustling to customize packaged solutions. That's pushing IT managers to seek application developers, data architects, database developers and administrators, as well as workers with expertise in data warehousing and data mining.

"In the e-commerce space, everything is brand new, and there's no base to work off of, so there's a disproportionate amount of development work that needs to be done. Everyone's starting from scratch," says Ken Surdus, vice president of technology at Send.com, an online high-end gift-giving service in Waltham, Mass. "Either you're customizing packaged software or you're building it yourself. Even if you're customizing, you still have a lot of development work early in the life cycle."

The Skills Survey reveals that 12% of IT shops expect to hire or retrain staff for CRM systems, 18% for data warehousing and data mining, 28% for e-commerce applications development, 30% for Internet applications development and 10% for enterprise

Skills Survey, page 58

The Skills

An enterprise move to capture their share of both the business-to-business and business-to-consumer plus, the need to be present early and get a better grip on their internal data, original equipment manufacturers and construction projects are driving skills requirements.

According to the 7th Annual Technology Skills Survey, by an average of 28%, IT managers expect to hire or retrain staff in the following areas:

Strong growth categories

Programming languages, Web development tools and object-oriented tools, data warehousing and data mining, e-commerce applications development, Internet applications development, and enterprise

Weak growth categories

Systems management, database development, and database architecture. The survey also found that 10% of IT managers expect to hire or retrain staff in the following areas:

Takin' It To the Web

Dabbie Lynch (far left) has spent just over nine years in IT at Hamsh's Entertainment Inc. in Memphis, as a graphic designer working on brochures, presentations, T-shirts and logos. Last year, she decided to move into the Internet/Internet arena, where Hamsh's is working on some key development initiatives.

To reach her goal, Lynch, whose new title is Web developer, spent 15 days in formal classroom training this year. She started with HTML and Microsoft FrontPage training and rounded that out with JavaScript courses. Now she's enrolled in the Certified Internet Webmaster certification program developed by ProcertTraining.com in Austin, Texas. She says the program is helping build her confidence in her new skills.

Pursuing the certification also helps solidify Lynch's transition within the organization, says Elissa Caswell (immediate left), vice president of IT services at Hamsh's. "We encouraged her to get certified because she has grown up with us; the certification gives her credibility." In conjunction with her formal training, Lynch was a key contributor to the Sept. 29 relaunch of Hamsh.com. The new Web site, which will continue to be upgraded over the coming months, will feature online reservations, account tracking for members of the Hamsh's Total Rewards program, online games and more. Designed to be more customer-service oriented, it's a significant step up from the previous Web site, which was essentially an online brochure.

"With the way Web technology is growing, it's a roller coaster that I want to be on," says Lynch, who's now working on a number of Internet projects, including a corporate procurement Web site. Next she's planning to add Macromedia Inc.'s Flash development tool to her growing skill set. "I'm learning something new daily, and I know it's not going away tomorrow - 10 years down the line, the Web will still be evolving, and I can evolve along with it," says Lynch.

- Linda Galt

That Thrill

COMPUTERWORLD'S

7th annual

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Skills Survey, page 58

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Business Demands Drive IT Demands

As companies move to capture their share of both the business-to-business and business-to-consumer pies, as well as to control costs and get a better grip on their internal data, original applications development and customization projects are driving IT skills requirements.

In fact, spending on e-commerce applications will increase IT budgets by an average of 5% next year, according to an October report by AMR Research Inc. in Boston. AMR projects that spending on applications next year will range from 17% to 29% of the total IT budget among manufacturers in all segments, and from 13% to 20%

among services companies.

Across all industries, e-commerce applications will grab 23% of the applications budget. CRM will take 19% and supply-chain management will account for 10%. Enterprise resource planning systems will continue to lead applications spending next year with 32% of the budget, but it's projected to drop to 28% by 2002, while e-commerce will jump to 25%.

Those forecasts are consistent with the IT priorities set for next year by a diverse array of companies contacted by Computerworld.

Send.com plans to turn its attention to "more

sophisticated Web techniques like personalization, more aggressive merchandising functionality and an emphasis on integrating CRM concepts into the organization," says Ken Surdan, vice president of technology. He says he needs application developers and hybrid database developers and administrators skilled with Microsoft tools such as Component Object Model objects, Active Server Pages and SQL Server, as well as JavaScript. VF Corp. in Greensboro, N.C., is proceeding with an SAP implementation across various divisions, a retail floor-space system that will tie into SAP and other systems to assist with sales, mar-



Takin' It To the Web

Debbie Lynch (far left) has spent just over nine years in IT at Hamrah's Entertainment Inc. in Memphis as a graphic designer working on brochures, presentations, T-shirts and logos. Last year, she decided to move into the Internet/intranet arena, where Hamrah's is working on some key development initiatives.

To reach her goal, Lynch, whose new title is Web developer, spent 15 days in formal classroom training the year. She started with HTML and Microsoft FrontPage training and rounded that out with JavaScript courses. Now she's enrolled in the Certified Internet Webmaster certification program developed by ProSoft Training Corp. in Austin, Texas. She says the program is helping build her confidence in her new skills.

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—Leslie Goff

That Thrill

keting and logistics planning and a number of e-commerce initiatives, including collaboration on a retail industry exchange named SoftSource-Merch.com. Tim Lambeth, vice president of global processes at VF, says he's looking for Java developers, SAP programmers and database skills for related data warehouse projects.

Limited Technology Services, the IT arm of multi-channel retailer The Limited Inc. in Columbus, Ohio, is looking for data architects, data modelers and developers to build an enterprise-wide data warehouse that will aggregate the data from all its brands, which include Vic-

toria's Secret and Lane Bryant. "We want to bring those views of our branded customers into a single view so [we] can see all customers across all brands and all channels," says CIO John Richter. The company needs Java skills and plans to add tools including middleware from Tibco Software Inc., Computer Associates Inc.'s ERM and Sybase Inc.'s PowerDesigner for data modeling.

Memphis-based Hamrah's has deemed Internet development work, continued refinement of a price-watching CRM system and development of an enterprise-wide data warehouse as priorities for next year, says Eileen Cassini, vice president of IT

services. "We are driving revenues incredibly through CRM," she adds. Cassini requires skills in Java, middleware, content management, IBM's WebSphere, C++, Visual Basic, user interface design, Unix systems engineering and more.

Sit machine maker International Game Technology in Reno, Nev., is also providing back-end technology services, and DeWitt Howard, manager of software systems support, says his software engineering group can hardly keep up with demand. "One recent casino in Tunica [Miss.] just put in an order for 1,500 machines," he notes. "It's the first time that systems are driving our pri-

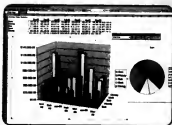
mary business," Howard says his company needs just about every major development skill, including Java, HTML, C, C++, Visual C++ and Oracle.

Starbucks Corp. plans to open 1,100 coffee stores worldwide in fiscal 2001. That's an average of two to three per day. "We're dependent on information moving rapidly," says Ted DellaVecchia, senior vice president and CIO. He says CRM- and SCM-related knowledge management systems will be key to the Seattle-based company's efforts. Needed technical skills include Java, XML, Oracle and SQL Server.

—Leslie Goff

Draw a line from the application to the

1.



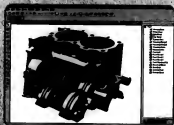
Microsoft Office 2000

2.



Adobe Photoshop 8.0

3.



Unigraphics Solutions Solid Edge

processor that can now run it faster.

A.



B.



C.



COMPUTERWORLD'S
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SKILLS
SURVEYContinued from page 54
resource planning systems.

As Coyle found, available development talent for these projects remains so scarce and competition is so fierce that many companies are planning their hopes on training to resolve skills gaps, aid recruitment efforts and — especially — to deter attrition. With the supply-and-demand gap showing no signs of closing, reducing turnover is critical, IT hiring managers say.

IDC in Framingham, Mass., projects that 66% of IT recruiting in 2002 will be because of replacement hiring. In total, IT staff attrition is projected to cost U.S. companies \$7.6 billion that year. In light of statistics like those, retraining IT professionals isn't just a good idea; it's a financial imperative. "[Retraining] is incredibly important to creating the right environment. It gets you out of those recruiting problems," says Eileen Cassini, vice presi-

dent of IT services at Harrah's Entertainment Inc. in Memphis. The company, which has ranked in the top five on Computerworld's annual listing of the 300 Best Places to Work in IT for the past two years, keeps IT turnover at between 5% and 8% per year, in part because of an emphasis on training, Cassini says.

"We take staff through a regular retooling and move them into new areas to give them a long career here without becoming redundant," she says. "You get great efficiencies from people who have been with you for a while."

Both smaller and larger companies are employing various strategies to retrain IT staff. Coyle notes that everyone on his IT staff will be sent for a minimum of 10 days' formal training next year. Harrah's has adopted an internal consulting model that allows IT staff to try new projects for a short period of time to verify whether they'd

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International Game Technology Inc. (IGT), a casino games and technology developer, is also counting on retooling to help ease its recruiting burden next year. When the Reno, Nev.-based company transitions its IT infrastructure from the AS-400 system to Windows 2000 next year, it will hang on to

The Most Wanted
Skills for 2001

IT managers rank the following as the technology skills they will be most looking in the coming year to hire or train internally for:

Rank	2000	2001	2002
Java	48	38	39
J2EE	37	45	37
HTML	71	41	37
Active Server Pages	48	40	37
Visual Basic	61	36	33
Perl	48	36	36
C++	45	21	26
C	42	14	20
COBOL	34	8	10
Microsoft Visual Basic	56	31	26
Oracle Developer 2000	29	17	20
Visual C++	30	16	17
PowerBuilder	20	8	10
TCPIP	80	35	35
PHP	37	7	6
XML	27	8	6
Oracle	49	31	34
Microsoft SQL Server	54	34	25
Microsoft Access	65	21	12
DB2	28	11	10
Sybase Adaptive Server	12	4	6

Operating System Skills

Windows NT/2000	79	43	37
Solaris	32	11	18
Linux	32	16	11
HP-UX	24	6	11
Other Unix	28	11	9

Networking Skills

Routing	57	22	12
Optical Ethernet	31	19	10
Ethernet switching	56	17	8
10 Base-T switching	48	10	6

Web Skills

Microsoft NT Server	71	31	22
Ethernet	64	19	10
HTTP	48	14	10
Novell NetWare	41	10	6

Other Client & Server Skills

Microsoft Exchange	52	26	21
Lotus Notes	23	17	7
Novell GroupWise	14	4	2
ccMail	15	2	2

Oracle	31	21	19
SAP	14	7	8
PeopleSoft	15	7	7
Sibel	8	6	5
J.D. Edwards	7	2	3

Internet application development	50	31	30
E-commerce app. development	36	27	28
Web server administration	53	25	23
Project management	57	28	20
Data warehousing & data mining	33	23	18

its RPG developers by moving them from the corporate IT department to the software engineering group.

With Silicon Valley only a few hours away, DeWitt Howard, manager of software systems support, says he has ample recruiting and retention problems. IGT's annual turnover rate is 38%; most developers depart for the lure of the San Francisco area.

Moreover, Howard and the corporate IT director sometimes find themselves competing for the same small pool of talent. Consequently, they have an agreement not to cherry pick each other's staffs.

IGT, which makes the popular slot machines Double Diamond, Wild Cherry, and Red, White and Blue, has expanded into providing Internet-enabled systems that automate back-end machine functionality such as hopper management and pay systems. In just the past two years, sales have

grown from \$85 million to more than \$1 billion, and the software engineering group is struggling to keep pace with the demand, Howard notes.

"We usually introduce five to 15 new games in a year; this year, we introduced 105," he explains.

Games developed by the company in the future will be built on an IP stack with the back-end monitoring systems provided over the Internet.

Howard says he'll gladly absorb and retain IT's 20 RPG developers, and they can have their pick of development languages to learn: Java, HTML, C, C++, Visual C++ or Oracle. Those who decide to pursue firmware design will be enrolled in a two-year intensive program at the Oregon Institute of Technology. Others will take local university courses. Each staff member will receive a minimum of three weeks of training.

Coyle says that in the end, he will

rely on training to fill his VB developer position. Early last month, he extended an offer to a tech-support specialist who had been working in a call center. While she didn't have the hands-on VB experience that CCS needs, she had completed a formal VB course and had been supporting Microsoft Access, another tool that CCS will be using as it moves forward with its data warehouse plans. Coyle says he'll send her additional VB training, and he adds that she'll learn on the job.

Coyle's 25-person IT shop is small compared with others in and around Boston, one of the most competitive IT job markets in the country. He says he typically has a hard time drawing candidates and an even more difficult time keeping them: Of the eight people he hired this year, four were replacements. If he gets two years from his new VB recruit, Coyle says, he'll be satisfied. ■



[Retooling]
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EILEEN CASSIDY
VICE PRESIDENT OF IT SERVICES,
HARRAH'S ENTERTAINMENT INC.

Top Dollars for Top Skills

Having the right technology skills can certainly pay off. According to IT managers, they're willing to pay the following salary premiums (additional pay for having a certain skill) for the following skills:

Skills	% of Total Salary Premiums Paid to Employees with This Skill	% of Total Salary Premiums Paid to Employees with This Skill
Java Server Pages	19	12
XML	15	15
Java	15	15
JavaScript	15	16
Active Server Pages	14	18
Java	15	12
C	13	6
C++	11	9
COBOL	10	11
Grade Developer 2000	17	17
Visual C++	13	15
Microsoft Visual Basic	11	9
PowerBuilder	4	14
TCP/IP	15	12
IPX	14	8
SNA	13	8
Oracle	17	17
Microsoft SQL Server	15	8
DB2	13	11
Microsoft Access	11	3
Sybase Adaptive Server	9	15

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OS/2	17	17
Windows NT/2000	17	14
HP-UX	13	8
Other Unix	13	9
Linux	12	17
Networking	18	14
Routing	18	14
Signal Ethernet	17	9
10 Base-T networking	15	4
Ethernet switching	14	6
Microsoft NT Server	16	13
HTTP	15	6
Novel NetWare	14	15
Ethernet	12	7
Microsoft Exchange	24	24
cc-Mail	24	24
Microsoft Exchange	16	10
Lotus Notes	12	17
Novel GroupWise	9	14
IBM	19	23
Oracle	17	20
J.D. Edwards	15	20
SAP	15	14
Lawson	13	21
Network development	20	9
E-commerce application development	18	24
Security	18	21
Director	18	16
Internet application development	17	17

■ Note: Computerworld conducted its annual skills survey in September-November of this year. Both by mail and online survey questionnaires. Approximately 307 companies, employing some 12,300 IT workers, participated.

COMPUTERWORLD'S
7th annual7 SKILLS
SURVEY

Continued from page 54
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DBMS/OLDBMS Skills			
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Gigabit Ethernet	31	19	10
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LAN Skills			
Microsoft NT Server	71	31	22
Ethernet	64	19	10
HTTP	48	14	10
Novell NetWare	41	10	6
Office, E-mail & Groupware Skills			
Microsoft Exchange	52	26	21
Lotus Notes	23	17	7
Novell GroupWise	14	4	2
ccMail	15	2	2
Enterprise Application Skills			
Oracle	31	21	19
SAP	14	7	8
PeopleSoft	15	7	7
Siebel	8	6	5
J.D. Edwards	7	2	3
System Software & Support Skills			
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Howard says he'll gladly absorb and retrain IT's 20 RPG developers, and they can have their pick of development languages to learn: Java, HTML, C, C++, Visual C++ or Oracle. Those who decide to pursue firmware design will be enrolled in a two-year intensive program at the Oregon Institute of Technology. Others will take local university courses. Each staff member will receive a minimum of three weeks of training.

Coyle says that in the end, he will

rely on training to fill his VB developer position. Early last month, he extended an offer to a tech-support specialist who had been working in a call center. While she didn't have the hands-on VB experience that CCS needs, she had completed a formal VB course and had been supporting Microsoft Access, another tool that CCS will be using as it moves forward with its data warehouse plans. Coyle says he'll send her for additional VB training, and he adds that she'll learn on the job.

Coyle's 25-person IT shop is small compared with others in and around Boston, one of the most competitive IT job markets in the country. He says he typically has a hard time drawing candidates and an even more difficult time keeping them: Of the eight people he hired this year, four were replacements. If he gets two years from his new VB recruit, Coyle says, he'll be satisfied. ▀



**[Retooling]
is incredibly
important to
creating the right
environment.
It gets you out of
those recruiting
problems.**

EILEEN CASSINI
VICE PRESIDENT OF IT SERVICES,
HARRAH'S ENTERTAINMENT INC.

Top Dollars for Top Skills

Having the right technology skills can certainly pay off. According to IT managers, they're willing to pay the following salary premiums (additional pay for having a certain skill) for the following skills.

	% OF SALARY PREMIUM PAID TO EMPLOYERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Web Development Skills		
Java Server Pages	10	12
XML	15	15
Java	15	15
JavaBeans	15	16
Active Server Pages	14	18
Language Skills		
Java	15	12
C	13	6
C++	11	9
Cobol	10	11
Development Tool Skills		
Oracle Developer 2000	17	17
Visual C++	13	15
Microsoft Visual Basic	11	9
PowerBuilder	4	14
Networking Skills		
TCP/IP	15	12
IPX	14	8
SNA	13	8
DBMS/ROBMS Skills		
Oracle	17	17
Microsoft SQL Server	15	8
DB2	13	11
Microsoft Access	11	3
Sybase Adaptive Server	9	15

	% OF SALARY PREMIUM PAID TO EMPLOYERS	% OF SALARY PREMIUM PAID TO CONTRACTORS AND CONSULTANTS
Operating Systems Skills		
OS/2	17	17
Windows NT/2000	17	14
HP-UX	13	8
Other Unix	13	9
Linux	12	17
Networking Skills		
Routing	18	14
Gigabit Ethernet	17	9
10 Base-T switching	15	4
Ethernet switching	14	6
LAN Skills		
Microsoft NT Server	16	13
HTTP	15	6
Novell NetWare	14	15
Ethernet	12	7
Office, E-mail & Groupware Skills		
cc-Mail	24	24
Microsoft Exchange	16	10
Lotus Notes	12	17
Novell GroupWise	9	14
Enterprise Application Skills		
SAP	19	23
Oracle	17	20
J.D. Edwards	15	20
SAP	15	14
Lawson	13	21
Systems Software & Support Skills		
Network development	20	9
E-commerce application development	18	24
Security	18	21
Directories	18	16
Internet application development	17	17

■ Note: Computerworld conducted its annual skills survey in September-November of this year, both by mail and online survey questionnaire. Approximately 300 companies, employing some 12,000 IT workers participated.

IT TAKES ABOUT 1,200 PARTS to assemble one of Intuitive Surgical Inc.'s surgical robots.

To comply with federal regulations governing the manufacture of such equipment, Mountain View, Calif.-based Intuitive must keep track of every part and process that goes into the assembly.

So far, Intuitive has used what's known as paper "travelers" to manually record the required information at various stages of the manufacturing process.

That's about to change. Intuitive is implementing new technology that will allow assembly workers to enter details of products being assembled, as well as to store work instructions and to test records on PCs installed on the plant floor.

Bar-code labels slapped onto every component used in the assembly process will allow Intuitive to keep track of each part from the time it arrives on the receiving docks to the time it ships.

If it works the way it should, Intuitive's Web-enabled manufacturing execution system (MES) will simplify the record-keeping process and provide the company with a wealth of real-time, unit-level data

that it can use for analysis, forecasting and even collaborative manufacturing in the future, says Don Chamberlain, a senior analyst at the company.

"We expect we'll have much more efficient manufacturing once the system is implemented," he says. Intuitive isn't alone. A growing number of manufacturers are looking at MES with renewed interest in their efforts to extract manufacturing data and use it in planning and forecasting applications that extend far beyond the factory floor, says David Monroe, an analyst at Plant-Wide Research Group, a Billerica, Mass.-based consultancy.

Most of the interest in MES is coming from companies with global manufacturing operations and those with multiple locations within the U.S., Monroe adds.

Wide Appeal

The push among manufacturers to leverage plant-floor data for strategic planning is being driven by a trend toward Web-based buying and selling, configured-to-order products, global outsourcing and a continuing push for better operational efficiencies, says David Krauthamer, MIS manager at Advanced Fibre

Communications Inc., a Petaluma, Calif.-based maker of telecommunications equipment.

Having access to real-time shop-floor data makes it easier for companies to track production schedules, forecast materials requirements, provide customers with order-tracking information and make changes later in the production cycle if needed, he says.

"Almost everyone is focused on improving operational margins" by providing more enterprise-wide visibility into the plant floor, Krauthamer says.

For example, a recent survey of 50 global manufacturing managers by Cambridge, Mass.-based Forrester Research Inc. found that 38% cited poor visibility into plant operations as their greatest challenge to expanding manufacturing operations overseas.

The XML Effect

Fueling the renewed interest in MES is the growing popularity of XML-based standards, Internet-based communications, object programming languages and the availability of Windows-based utilities that make it relatively easy for companies to install such systems, says Monroe. "MES has come and gone over the years... It has had its waves of popularity; it has had its wave of needs," he says.

What's driving MES today is "this whole movement away from build-to-stock to a build-to-order" manufacturing model, says David Cone, president of Camstar Systems Inc., a vendor of MES software in Campbell, Calif. As a result, "a lot of companies want to coordinate the movement of information and goods, not just within a single plant but between multiple sites," Cone adds.

Take Acma Computers Inc., an assembler of custom-built PCs in Fremont, Calif. The company needed to find a way to deal with the complexities of planning and processing customer-built configurations over the Web. Acma's paper-based tracking and quality-measurement systems were totally inadequate when it came to providing plant managers and customers visibility into activities such as checking order status, production schedules and inventory levels.

So, earlier this year, Acma installed technology from San Jose-based Datasweep Inc. that lets assembly-line workers get order instructions, enter quality records and swipe bar codes to enter the details of components used in the manufacture of Acma's PCs. This sort of work-in-progress information-gathering has contributed to better configuration and inventory management and has provided Acma's customers with instant order access, says Allen Lee, Acma's president.

"Overall, it improved productivity, efficiency, quality, customer satisfaction and internal resource control," Lee says. For example, output per employee increased from 85 to 111 PCs per week after the system was implemented, he says.

Stepping Out

The shift toward Web-based communications and custom orders has considerably broadened the scope of MES applications, Cone says.

Until recently, MES was mainly used as an internally focused, highly customized tool for gathering information across single product lines or to perform function-specific tasks such as quality monitoring. There was little or no integration among different plant-floor systems, and the data was rarely used off the shop floor, Cone says.

"MES in the past has been basically used inside the four walls" of a manufacturing facility, Cone says. "Today, it provides an external view of the factory. That is the biggest change." ■

DAVID KRAUTHAMER of Advanced Fibre Communications. Manufacturers use of plant-floor data is partly driven by a trend toward Web-based buying and selling.

Picking Data Off The Plant Floor

Manufacturers tap into shop-floor data to track and tweak their production schedules. By Jaikumar Vijayan

E-Business Models

DEFINITION

An **e-business model** is an approach to conducting electronic business through which a company can sustain itself and generate profitable revenue growth. The business model spells out how a company plans to make money online and how it's competitively positioned in an industry.

BY RICHARD TROMBLY

AN E-BUSINESS model is simply the approach a company takes to become a profitable business on the Internet. There are many buzzwords that define aspects of electronic business, and there are subgroups as well, such as content providers, auction sites and pure-play Internet retailers in the business-to-consumer space. Many Internet firms witnessed a meteoric rise in their stock values in the late '90s, only to crash this year. For instance, Drkoop.com Inc. in Austin, Texas, announced its initial public offering at \$9 per share in June last year. The price rose to more than \$30 per share but has since plummeted to less than \$1 per share.

Given the carnage among dot-com stocks...is year, what online business models are expected to succeed in the future? "What we learned was what we knew all along," says Kenneth P. Morse, a senior lecturer and managing director of the MIT Entrepreneurship Center in Cambridge, Mass. "Businesses need to make more money than they spend. The new model is the old model, but technology is essential to maintain a competitive advantage, and cash flow is more important than ever."

Yahoo Inc. in Santa Clara, Calif., operates a successful portal site, providing content and an Internet search engine. However, many portal sites, such as Go.com, MSN.com and AltaVista.com, have fallen on hard times.

The idea behind portals is the same as that behind television advertising: aggregating eyeballs and directing them toward advertisements. But television viewers are passive, and people need to wait through the ads to see the

shows they want to watch.

"But the Web doesn't work that way," explains Bill Frezza, a general partner at Adams Capital Management Inc. in Sewickley, Pa. "Content presentation is not serial. Viewers are active, not passive. There are always thousands of places to go. No Web advertisement can match a 15-second TV spot."

When First-to-Market Fails

Many of the failing companies were operating on a first-to-market strategy. Their hope was that by getting their ideas out ahead of the market, consumers would develop brand loyalty before competitors arrived.

Priceline.com Inc. in Norwalk, Conn., is a good example of a company that attempted this strategy, with its name-your-own-price scheme for buying airline tickets and other goods.

But the closing of its Greenview, Conn.-based WebHouse Group licensee — which applied the same model to groceries and gasoline — combined with increased competition from airlines and other travel sites has led Wall Street to travel Priceline.com's stock down to less than \$3 per share, from a high of \$104.25 in March.

"First-to-market as a business model has always been risky. You are vulnerable because you have nothing proprietary, need vast funding and rely on rapid deployment," says Carol Brennan, president of Massachusetts Technology Development Corp., a venture capital firm in Boston.

So why did investors and venture capitalists get caught in such speculative and irrational investments?

"Investors felt that they were investing in technology, when they were really investing in retailers and distributors," says Bill Younger, managing director of Palo Alto, Calif.-based Sotter Hill Ventures. "These companies have small profit margins. They

couldn't justify their valuations in typical price/earnings ratios. When does it turn profitable? Companies like Amazon.com have yet to answer that."

One segment of the business-to-consumer world that's thriving is niche markets. Scott Galloway, CEO of Internet incubator Brand Farm Inc. in New York, has been responsible for several successful Internet sites that target a niche.

For example, RedEnvelope Gifts Inc., which launched in 1997 as 91gifts.com, began as a last-minute gift site but now markets more than 1,000 items that are unique to the site. Customers seem willing to pay a premium for RedEnvelope-edited selection and enhanced customer service. The company has \$30 million in sales, with a 46-plus profit margin.

"There needs to be a quick path to profitability," Galloway says. "And the ultimate metric is margin. There are three levers to achieving margin: edited selection, customer service and inspirational branding."

The B2B Way

Roslyn Doktor, a vice president at McConnell International LLC, a global technological policy and management consulting firm in Washington, looks at e-business models another way. "Is the model buyer- or seller-centric? What is the driving force of the business?" she asks.

The greatest strength of the Internet, says Doktor, is its ability to bring together people, governments and businesses and facilitate the flow of information among them. That's one of the main reasons why business models for business-to-business online marketplaces are expected to succeed, she says.

"It's clear that the Internet is a viable platform for B2B trade," says Matthew Sanders, an analyst at Forrester Research Inc. in Cambridge, Mass. According to Forrester, a

There needs to be a quick path to profitability. And the ultimate metric is margin.

SCOTT GALLOWAY, CEO, BRAND FARM INC.



projected \$2.7 trillion in business-to-business transactions will be made online by 2002.

But private marketplaces being formed by industry leaders represent a more successful model, argues Younger.

"These real-time supply chains and e-business design systems are phasing out the more expensive and inflexible [electronic data interchange networks]," he says.

"I think the real surprise has been how hard it is to become profitable," says Jim Brodo, managing director at SMGnet, a Philadelphia firm that offers training in e-business models through computer simulations.

The cost of branding and the technology is so high and [consumers] still use the catalog," says Brodo. "The Web site is just another channel."

Trombly is a freelance writer in Revere, Mass. He can be reached at richard.trombly@the-spa.com.

Examples of E-Business Models

B2C - Businesses sell to one another. Companies through online exchanges such as Covisint, a supply-chain partnership of major automakers.

B2C - Businesses sell to consumers via Web sites such as Amazon.com.

B2B - Business-to-government services.

P2P - Peer-to-peer, where individuals trade goods with one another, e.g., Napster.com.

E-marketplaces - Where buyers and sellers trade their goods online.





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Dear Career Adviser:

I worked at one company for eight years as a systems analyst and then as a software developer. Now, I'm an Oracle database administrator. I left my old company to join a start-up, but now I want to return to my old job. Can I go back? — RETURNING HOME

Dear Returning:

Finding and keeping good technical talent is expensive and difficult in today's job market, says Paul Anaki, director of information systems at Chase H&C, an investment bank in San Francisco. Therefore, when the opportunity arises, many managers prefer to rehire someone they know who's already trained and whom they like working with.

Aside from being able to instantly explain your desire to return because of the market's downturn for smaller companies, there are several criteria for a successful return "home." They involve your relationship with your manager (which needs to be excellent), your prior performance reviews, how you ended that particular job and how you explain your reasons for returning.

Ideally, you provided your boss with a reasonable notice period and offered to provide

transition assistance and support when you left. Plus, you're coming back for more than money, or else you'll be easy pickings for being recruited out once again.

Since you've gone full circle, don't discount any changes your employer might have made during your absence. Many larger companies have learned a lot from departing dot-commers and loosened up considerably, says Anaki. You might find a Ping-Pong table replacing conference room furniture, higher salaries, quicker reviews and better access to training welcoming you back.

Dear Career Adviser:

I'm a full-time mom who wants to return to work in Chicago or a nearby suburb. I graduated with a bachelor's degree in computer science, got an Oracle PL/SQL developer job for a year and left my career in 1997 to care for my newborn. To return to work,

I've studied by myself and I obtained my Oracle database administrator certification in July. Recruiters call me, but I have no work experience and after two months, I'm battling zero.

— SHUT-OUT MOM

Dear Shut-Out:

Broadly speaking, announcing a lack of work experience and the needs of a young child who might put demands on your time could hurt you, even with your Oracle PL/SQL talents and an Oracle certification. And there's also the issue of timing, says Darcy Zulpo, founder of Geneva, Ill.-based recruiting firm CoPIA Resources.

During the fourth quarter, most companies are putting their efforts toward hiring

professionals with experience. They have limited time to interview and are looking for individuals who can plunge in full-speed ahead.

Companies usually plan move-level hiring during the first quarter of the year, when they have more time to orient and train less experienced help.

If you must get to work now, Zulpo's advice is to look for a contract position on job boards, such as those of Dice.com, ComputerJobs.com Inc., HotJobs.com Ltd. and ITWorld.com Inc., and go to your accreditation school's career center for help.

Finally, like many job seekers, you may find that your résumé and cover letter need work. Get someone who's really good at spelling and grammar to review all of your materials before you email-mail or e-mail them out. This alone might substantially improve your results when potential employers see documents that use correct English grammar.

Dear Career Adviser:

I've been asked to take a job as a lead engineer at a company that focuses on Web-

enabled portable devices. The company is part of an incubator. Is this more risky than being part of a company that's already received venture capital funding?

— RISKY BUSINESS

Dear Risky:

The value of an incubator can be significant, says Eric Kidd, chief technology officer and vice president of engineering at Pasadena, Calif.-based Petstomat.com Inc., a company that was incubated by Idealab. You typically get immediate infrastructure such as equipment, systems and hosting, as well as access to people with the know-how to help you get started.

This lets an early-stage company focus on bigger issues, such as financing and finishing up the business model. Also, being part of an incubator lends legitimacy to the founders and their ability to network their way up the food chain. A well-known incubator can help a company get venture capital funding, find the right partners and bring in customers.

Since many venture capital-funded companies are having trouble getting second-round funding, it's not necessarily more risky to link up with a company that's part of an incubator. You just need to know whether the incubator is well-known with the right contacts and resources. ■



CONFERENCES

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www.conference-board.org

BRIEFS

Study: Tech Firms Lack Female Execs

Fortune 500 technology companies have a lower percentage of women corporate officers than Fortune 500 companies overall, according to the Census of Women Corporate Officers and Top Executives, a study by Catalyst Project Inc., a research firm in Washington, D.C. As of March 31, women officers in technology companies accounted for 9.4% of all technology officers, compared

with 12.5% in the Fortune 500 overall.

Of the 56 technology companies in the Fortune 500, a few are exceeding the norm: Pitney Bowes Inc., Hewlett-Packard Co., SBC Communications Inc., US West Inc. and Unisys Corp.

Home Users Drive Cable, DSL Growth

Home users craving higher-speed access to the Internet will push cable and Digital Subscriber Line (DSL) access growth by an average of 77% per year from last year to 2004, according to Gartner Inc. That Group in Scottsdale, Ariz., Overall revenues for those two services will jump from a total more than \$1 billion last year to \$13.3 billion in 2004.

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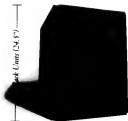
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TECHNOLOGY

BUILDING A MOBILE NET

Handheld devices are proving that they can link back offices to mobile workforces. Managers of a work order application used by a company called Home Finishes say they started small, ran trials, created a simple software program and picked a cheap standard handheld device to support the software. » 70

OPEN-SOURCE INCUBATOR

Work on the first independent Open Source Development Lab is scheduled to start in Portland, Ore., this month. The lab is touted as a place to promote open-source software collaboration and growth. » 70

SECURITY JOURNAL

An experiment with downloaded hacking programs proves revealing, as Jude uses one utility to get in easily under his company's security system radar, unnoticed by the intrusion detection software he carefully set up. » 72

BUILDING PEER RELATIONSHIPS

Peer-to-peer computing — in which companies bypass expensive servers and storage networks and instead use the processing and storage capacity on their employees' computers — is gaining currency.

As that happens, control, security and reliability will become concerns. » 76

FUTURE WATCH

For NASA, the future of communications lies in off-the-shelf Internet networking software and security techniques tested in the commercial arena. In this scenario, scientists and engineers will be able to share data with maximum ease, and space travelers will be doing their holiday shopping online. » 76

QUICKSTUDY

Storage virtualization is the presentation of a single, virtual data storage interface to users. A middle layer of software — and sometimes hardware — translates between the users' views of the data-storage devices and how the storage is really configured. This can simplify things for users and systems administrators, as long as they know what their vendor means by storage virtualization and how it's implemented. » 85

EMERGING COMPANIES

Mobile Automation fills a niche overlooked by desktop management software vendors: laptop and mobile device management. The company manages remote devices over the Internet, which makes tracking mobile users easier. But it faces some stiff competition. » 86

MORE

Sid's Scope..... 87



GEEK TOYS FOR A COOL YULE

ARE YOU READY TO FIND a gift for your favorite nerd?

Computerworld is here to help, with a compendium of some of the niftiest electronic items available for the holiday season. From digital cameras to intriguing software, a haptic mouse or even a remarkably sleek but powerful laptop, we've got suggestions for you.

80

BRIEFS

Red Hat Linux 7 Ready For Alpha Servers

Red Hat Linux 7 Alpha Edition is now available for Linux processor-equipped servers from Compaq Computer Corp., providing on-board security, new on-board features and optimized software for new OS and ES AlphaServers and all Compaq AlphaServers, according to Research Triangle Park, N.C.-based Red Hat Inc. The open-source operating system, priced at \$79.95 per user, includes a full assortment of developer tools, a hard-drive partitioning utility, 90 days of Web-based technical support and 30 days of phone technical support.

Unicenter TNG 2.4 For Linux and More

Unicenter TNG 2.4, the latest version of the e-business suite from Computer Associates International Inc. in Milpitas, N.Y., is now available, featuring comprehensive support for several Linux platforms and special features for the managed-service provider market. The new version includes the ability to use Linux as an enterprise management platform, enhanced Windows 2000 performance monitoring and enhanced storage-area network support functions.

Wireless Security Products Announced

Network Associates Inc. in Santa Clara, Calif., last month announced a new range of products that includes Wireless Intrusion Detection software for cell phones, POP servers Internet and virtual private networks for broadband users and Sniffer Wireless LAN protocol analysis tools.

IBM Releases Linux Small Business Suite

IBM has released Small Business Suite for Linux, including applications for managing and collaboration, Web site design and database management. The suite, which IBM says is the first aimed at small businesses that use Linux, sells for \$499 plus a \$99-per-year license.

Handhelds Link Field Workers and Builders

Work-tracking application reduces paper trail, ensures data accuracy and integrity

BY MATT HAMBLIN

HANDHELD computers are increasingly making inroads with businesses that want to tie field operations to enterprise databases.

But getting an application to effectively talk to a database involves planning, testing and carefully evaluating both hardware and mobile software, according to two managers on a recent test of a mobile work-tracking system at Home Finishes Inc. in Livermore, Calif.

In August, Home Finishes and its partner, PricewaterhouseCoopers in New York, rolled out an application on Palm handhelds that lets employees quickly make work-order requests for repairs while walking through recently built homes. The repair notices go to Home Finishes' large Clarify database from Nortel Networks

Corp. in Brampton, Ontario.

"Before, it was a pad of paper filled with orders that were faxed later in the day, so you had all the data entry people and the accuracy problems with that," said Chad Downey, PricewaterhouseCoopers' project manager.

Inexpensive and Familiar

Home Finishes plans to sell the application to builders and others, so it picked devices from Santa Clara, Calif.-based Palm Inc. because of their relatively low cost and brand-name recognition, Downey said. And the application may be used by home buyers, who would have a greater chance of being familiar with the Palms, he said.

Chris Gatley, senior vice president at Home Finishes, said smart phones were also

evaluated because many field workers carry cell phones and it might have made sense to have a device with both phone and database functionality. But during development, planners realized that clicking on items on a drop-down list would be confusing for users if the same device suddenly rang and



HOME REPAIR WORKERS can order repairs with a Palm device and software from Home Finishes.

needed to be used as a phone, he said.

Home Finishes' application allows needed home repairs, such as missing hinges or faulty electrical switches, to be recorded and posted on the

company's Web site. Home buyers and subcontractors can check online to see when repairs are needed or completed. For example, a painter might use the system to coordinate his time with other workers without making numerous phone calls, Gatley said.

Downey oversaw the creation of both the application that's native on the handheld device and the software conduit to the Clarify database. The data, once entered on the Palm, reaches a server at Home Finishes, which checks to make sure that all the data fields have been entered.

To prevent the transmission of incomplete or inaccurate data, the servers do a password check on the Palms, which each have their own digital signature. To further ensure accuracy, Home Finishes blocks the ability to beam data between handhelds via infrared, Downey said. Half-hour training sessions also help reduce the introduction of bad data, Downey said. Before the

August rollout, a user trial was held. "The user test was just critical because we had to make sure the application was easy enough to use that inspectors weren't going to just throw their Palms at something," he said. ■

Work Set to Start This Month on Open-Source Lab

HP, IBM, Intel, NEC team to back facility

BY TODD R. WEISS

Work is scheduled to begin this month on the independent Open Source Development Lab in Portland, Ore. touted by its organizers as a place to promote open-source software collaboration and growth.

Sources close to the lab are keeping details, including the exact site location, quiet until work officially begins.

Announced in August by a group of corporate backers, including Hewlett-Packard Co., IBM, Intel Corp. and NEC Corp., the multimillion-dollar lab is envisioned as a place

where Linux and other open-source developers from around the world can have free access to high-end computer hardware for code-testing and collaboration.

Organizers have been meeting weekly to make final plans, create an organizational structure and secure a site that's independent from the lab's backers, according to Dan Frye, program director of IBM's Linux Technology Centers in Somers, N.Y.

Development Boon or Bust?

This month the site and the name of the lab's manager will be announced. "Clearly, hardware will not be in that time frame," said Mike Balsma, a spokesman for HP. Organizers

hope to have the lab up and running to the first quarter, he said.

Bill Claybrook, an analyst at Aberdeen Group Inc. in Boston, said the lab's premise could be a boon to future Linux development. "I think, over the long haul, it should really help significantly" by creating a place where the focus can be placed on readying Linux for large-scale enterprise computing by improving the scalability and availability of major-brand applications, he said.

Others are less sure about whether the lab can help bring about such progress.

One software developer, who asked not to be named, said Linux developers haven't had trouble getting the latest machines to test their code because hardware companies are often willing to give access to needed equipment.

He said their payback is that if the software is successful, the vendors can advertise that

their hardware supports it.

"From a pure geek/hacker point of view, I don't see where [the lab] is incredibly useful or moves mountains, because these [Linux development] areas always find a way to get it done," the developer said.

Neutral Space Needed

The lab will be accessible to developers around the world through Internet connections or on-site visits, said Seth Walker, an Intel spokesman. "This is the entity that everyone in the industry is looking toward to help bring everybody together," he said.

The four partner companies are providing personnel and millions of dollars, but will see money to get the project started, although an exact figure hasn't been disclosed.

"The important thing for us is [making sure] that we had space that was neutral — that wasn't on any company's campus," Walker said. ■

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The Confessions of A White Hat Hacker

Using downloaded hacker utilities, Jude easily breaks into his company's Web site — and goes undetected

LAST WEEK, I spent most of my time exactly what Nmap can do and much more. The big difference between the tools — apart from the fact that Nmap is free and Internet Scanner most certainly isn't — is the slant each puts on this function.

This "white hat" nomenclature confused me when I first heard it. White hat is a fairly common term for people who hack legitimately — security staff, researchers and so on. By contrast, black hat hackers hack maliciously. Basically, white hats are the good guys; black hats are the bad guys. Gray hats are somewhere between the two, and nobody knows where Red Hat Linux fits in with all this.

I'm told the terms come from the early Western movies. Because the movies were filmed in black and white, the chase scenes tended to get a bit confusing, until someone decided to give the good guys white hats and the bad guys black hats. Anyway, back to Linux.

Frisks and Thrills

Nmap impressed me. It's simple, it's powerful, and it does exactly what it says it does: It maps your network. The author, who goes only by the name Fyodor, even includes a short but well-written HTML manual in a choice of five languages. The program is freeware, so you've got to admire the amount of work that he's put into it.

Nmap runs ping sweeps to find out what machines are connected to your local network, a port scan to find out what services each machine is running and TCP/IP fingerprinting to find out what operating system each is running. The result is a log file giving you a reasonably complete list of what's on your network and what it's doing. That's useful information both for a security manager and any hacker.

We also run Internet Scanner from Atlanta-based Internet Security Sys-

tems Inc. (ISS). Internet Scanner can do exactly what Nmap can do and much more. The big difference between the tools — apart from the fact that Nmap is free and Internet Scanner most certainly isn't — is the slant each puts on this function.

The ISS tool gives a much more user-friendly graphical user interface (GUI), advertises its presence to anyone being scanned and so on. It's clearly designed to fit into a corporate environment.

Nmap, on the other hand, is designed for technical staffers who want to dispense with the frills: It's much faster, and it's designed to be run in "stealth mode" so as to avoid detection by intrusion detection software. It certainly sneaks in beneath the radar of our intrusion detection software, RealSecure from ISS. That's something we'll have to sort out.

Sniffing for Hack Attacks

Next up was Sniffit, a network packet sniffer. Packet sniffers are rather intriguingly named pieces of software that monitor network traffic.

Under many networking protocols, data that you transmit gets split into small segments, or packets, and the Internet Protocol address of the destination computer is written into the header of each packet. These packets then get passed around by routers and eventually make their way to the network segment that contains the destination computer.

As each packet travels around that destination segment, the network card on each computer on the segment examines the address in the header. If the destination address on the packet is the same as the IP address of the computer, the network card grabs the packet and passes it on to its host computer.

That's how I think it works, anyway. I'm sure there are many network engineers out there who are championing at the bit to explain the many subtle but

important errors I've made (feel free to drop into my forum at Computerworld's online Security Watch Community, (www.computerworld.com/security/), but frankly, that little model seems to work for me.

Promiscuous Network Cards

Packet sniffers work slightly differently. Instead of just picking up the packets that are addressed to them, they set their network cards to what's known as "promiscuous mode" and grab a copy of every packet that goes past. This lets the packet sniffers see all data traffic in the network segment to which they're attached — if they're fast enough to be able to process all that mass of data, that is. This network traffic often contains very interesting information for an attacker, such as user identification numbers and passwords, confidential data — anything that isn't encrypted in some way.

This data is also useful for other purposes — network engineers use packet sniffers to diagnose network faults, for example, and we in security use packet sniffers for our intrusion detection software. That last one is a real case of turning the tables on the attackers: Hackers use packet sniffers to check for confidential data, we use packet sniffers to check for hacker activity. That has a certain elegant simplicity to it.

I've known of packet sniffers for years, and I've talked about the dangers of attackers using packet sniffers in many a consulting assignment, but like many consultants, I've never actually used one before.

One of the reasons for that is simple fear — I'm not that technical at the best of times, but networking is by far my weakest subject. So I've avoided trying packet sniffers because I expected to get swamped by all sorts of networking jargon and problems that would send me running to our network support guys. I feel embarrassed enough that I can't get my head around the concept of subnet masks, so I don't want to display my greater ignorance if I can possibly avoid it.

The thing that worried me most about Sniffit was how easy it was to install. It took about three commands and three minutes to get this thing installed and running on my Linux machine. It even has a GUI (not exactly pretty, but hey — it's free).

Like Nmap, Sniffit is very easy to use

THIS WEEK'S GLOSSARY

Intrusion detection software: Specialized security programs that monitor log on attempts, security logs and other information to try to detect unauthorized attempts to access the corporate network.

TCP/IP fingerprinting: The process of analyzing the TCP/IP protocol stack of a remote computer on a network to discover its operating system and version.

Ping: This utility for TCP/IP-based networks sends a query packet to a target network user or host address and waits for a reply to confirm its presence on the network.

LINKS:

<http://packetstorm.security.com/UNIX/sniffit/ffr.html>
The PacketStorm Web site tells itself as an online security library. Follow this link to download the Ffreak program.

<http://www.insecure.org/>
Visit this hacker Web site to download the Nmap program.

www.symbolic.it/Products/sniffit.html
The link takes you to the Sniffit packet-sniffer utility, available from ProdiNet Network Security Co. in Parma, Italy.

www.nmr.org/files/sniffit/index.html
Visit this site to download Switch, a log analyzer, and Tracer, a file-integrity checker program.

and does exactly what it says it does: It sniffs your network and shows you what sort of data is getting passed around.

I'd recommend that you install a packet sniffer and have a look at what sort of data you can see on your local network. Better still, get one of your network engineers to install it for you. They probably know if better, more professional sniffers and will be able to talk you through some of the data that you see going past. It's an interesting look into exactly what's going on within your network.

Firewalk, Switch and Tripwire stumped me. I don't yet know what I'm doing wrong, but I can't get these things installed. I may not get around to it, though, because my long-awaited laptop has finally arrived. Now, I can get back on course with all those projects that have been on hold for the past couple of weeks. ■



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*Source: IDC December 1999: Who Will be Leading the Global IT Services Industry in 2001? A Competitive Analysis by Maum Pares, Sophia Janna Mayn.

Rewards May Outweigh Risks of Peer Networking

Sharing resources is more efficient,
but rogue users could down the network

BY MATT HAMBLIN

THE CONCEPT behind peer-to-peer computing is relatively simple and not all that new. Instead of using big, expensive servers to crunch numbers and pricey storage networks to hold data, companies can do the job more efficiently in some instances using the processors and storage capacity on the desktop computers of their employees.

And if peers share data and computing duties among themselves, that reduces the need for fat network connections to back-end servers or mainframes, because data is pushed from desktop to desktop around the edge of the network rather than to the network core and back again.

But come on, say some users: Peer-to-peer might be fine for teen-agers swapping music files, but for computing in big, old-line corporations? Get real.

Peer-to-peer could be a secu-

rity and reliability nightmare, especially if hackers or, worse, competitors get into a peer network that by definition has many more machines set up to share information than a standard one. Analysts acknowledge that peer-to-peer is unusual and potentially threatening for large corporations.

"With peer-to-peer, if one moron working in your company loads a goofy screen saver that puts his PC into lock, then everyone will ask, Why is the network so slow?" said Josh Turiel, a network services manager at Holyoke Mutual Insurance Co. in Salem, Mass. "All it takes is one moron to ruin a peer-to-peer network, and it's a lot tougher to ruin a server-based network."

Napster Blazes Trail

Loss of control over systems might be the hardest part of peer-to-peer for IT workers to stomach, but there's no question that the concept has new vigor, thanks to the consumer success of San Mateo, Calif.-

based Napster Inc.'s MP3-sharing program and variants that depend more or less on a server in concert with peers (see diagram below and Technology, Nov. 20).

In August, Intel Corp. kicked off Hillsboro, Ore.-based Peer-to-Peer Working Group (www.peer-to-peer.org), which comprises IBM, Hewlett-Packard Co. and 20 smaller member and supporting companies that hope to standardize peer-to-peer technologies.

But some companies are already using peer-to-peer computing to do certain jobs without feeling a loss of control over systems.

Lex Rocklage, a network manager at commercial builder DPR Construction Inc. in Redwood City, Calif., said he has connected about 1,500 desktops and laptops in peer-to-peer fashion for virus scans since May.

DPR uses a file-sharing capability called Rumor from myCIO.com, a subsidiary of Network Associates Inc. in Santa Clara, Calif. Any PC in the network can contact myCIO.com to download the latest virus definition, and then subsequent PCs receive the

update from the first PC or the machines it has updated, Rocklage said.

What if the update sent to DPR somehow contained an error that would quickly spread to the rest of the system? "We've considered that issue, but the online help from myCIO usually takes just a couple of hours, and they've been very responsive to our needs so far," Rocklage said.

"We do have to have some trust with myCIO, but I don't think we're giving up any control and haven't had any real problems from peer-to-peer," he added.

Aside from offering specific services that customers expect, analysts said, many companies are customizing some established network management products from companies such as HP, SAP AG and Tivoli Systems Inc. in Austin, Texas, to do computing jobs with peers or to store on remote machines.

In a study to be released next month, Omni Consulting Group LLP in Davis, Calif., plans to detail the results of a study of 1,500 companies in a variety of industries using some version of peer-to-peer technology. Overall, there's

18% to 19% greater efficiency in the use of system resources with peer-to-peer than with conventional methods, said Omni analyst Frank Bernhard. In some of the cases, the study found that companies are just using the IP address of a remote desktop and accessing its hard drive to store data.

Determining Risks

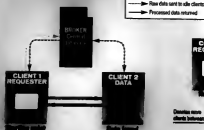
"CIOs should not feel threatened and should not relinquish the strategy of the organization when considering peer-to-peer," Bernhard said. "There's infancy in it right now, but peer-to-peer has real value for large corporations."

"Even for the Fortune 500 company, a P2P architecture that leverages internal resources behind the firewall doesn't take control away from the IT manager," added Mark Eggleston, an analyst at research firm Currid & Co. in Houston. "Instead, it provides the resource-strained IT department with a vast, distributed and manageable array of cycles, storage and redundancy."

And John Coons, an analyst at Gartner Group Inc. in Stamford, Conn., said he believes that once a business figures out who can be trusted to join in a peer-to-peer network, such a system can help. "Ultimately, this could save people money, since there are a lot of resources in those PCs that sit idle for two-thirds of the day," he said. ■

Broker-Mediated File Sharing

Example: Napster



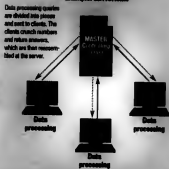
Peer-to-Peer File Sharing

Example: Gnutella



Cycle Sharing

Example: SETI@home



The Future Is Now for NASA

The space agency is using standard Internet software for space missions. By Barbara Forster

EARLIER THIS YEAR, a NASA satellite used the Internet to phone home. Hardly an earth-shattering event—or was it?

The call was made possible by OMNI (Operating Missions as Nodes on the Internet) engineers at NASA's Goddard Space Flight Center, who uploaded standard Internet software to an orbiting UoSAT-12 satellite and then received data via the Web. It worked, which didn't surprise the engineers. What it means, however, is that NASA satellites can have their own IP addresses and send and receive Internet messages and data. That's brand-new for space jockeys.

With NASA's current system, the Consultative Committee for Space Data Systems (CCSDS), transmissions are routed to special buses and then to a protocol for Level 0 processing. After that, the data goes out.

"It's not that IP is better or worse [as a networking tool]; it's that CCSDS is just not compatible with the rest of the planet," says Ron Parise, a senior scientist at Computer Sciences Corp. (CSC) in El Segundo, Calif.

The glitch, Parise says, is that the CCSDS protocol doesn't have a network layer. Hurdles such as intermittent connectivity and noisy links seemed insurmountable, particularly when every project had customized protocols.

While the scientific world was stymied, private companies, which faced the same problems, forged ahead, solving forward-error correction problems and developing ratchet modems.

The OMNI team says that it's confident that commercial security products will also provide sufficient protection and

privacy for NASA projects.

"The bottom line is that adequate measures are available now," says James Rash, OMNI project manager. "International stock markets and financial institutions use the open Internet for trillions of transactions every day. Those security measures are available to us."

As an added precaution, using closed communications channels—a traditional NASA operation—remains an option, even with standard IP.

The UoSAT-12, sent up last year by U.K.-based Surrey Satellite Technology Ltd., was chosen because it already uses high-level data-link control framing. Porting an IP stack to one of the spacecraft's onboard processors was a simple task.

The network approach is producing winning scenarios. Scientists are already familiar with the Internet's capabilities;

collaborative science missions are possible because IP provides a common link. For example, earth-science mission data that's retrieved from sensors in ocean buoys or balloons can be relayed from the sensors to satellites, which can then be easily accessed by scientists.

Another mission advantage is commercial IP's ability to significantly reduce integration costs. Currently, instrumentation developed in one lab travels to where a spacecraft is being built. Teams of engineers must spend weeks on interphase documents to communicate among sites.

"With both on an Internet protocol, people can stay where they are, hook up to the Internet from a workstation and begin talking," says Rash.

An upcoming project at the University of California, Berkeley, is using this approach.

"We don't fly satellites to build communication infrastructure; we fly satellites to do science," explains Keith Hogle, a CSC senior consulting engineer.

ner. "If we spend less on infrastructure, we can do more science."

Because ground systems or end users don't need special communication hardware, a wide range of off-the-shelf hardware and software is available. Better yet, somebody else picks up the costs for development, debugging and ongoing maintenance.

"Thirty years ago, [space] communication was special," says Hogle. "Today, NASA doesn't need to invent new things. They can reap the benefit of the money they put into Internet connectivity."

Web Call to Mars

Although the OMNI project was initially geared toward establishing an IP network among LAN-based satellites and balloons, the technique is ideal for more distant missions, including those planned to Mars.

"Future NASA missions will require more networked assets, and the cheapest and quickest way to do this is with standard protocols," explains Rash.

The original test satellite was a minivan filled with the same equipment now on the UoSAT-12 satellite: computers, a power supply, a transmitter, an antenna, movable cameras and a standard Internet router. To gather data, the OMNI team drove the "spacecraft" around

Goddard Space Flight Center in Greenbelt, Md., while people at NASA's Glenn Research Center in Cleveland were at a Web site controlling the video camera onboard the van. NASA's Tracking and Data Relay Satellite System sent data to a ground station at White Sands, Ariz.

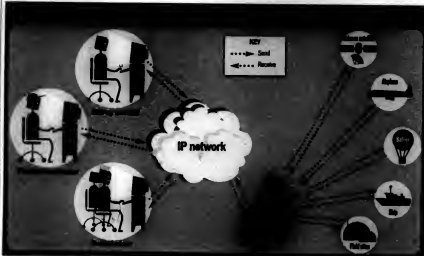
For a real mission test, the OMNI team went to the Black Sea for the last solar eclipse of the century. In August of last year, the prototype satellite equipment sent live weather data and images via the Web.

Eclipse data went to Goddard and was distributed to mirror systems at centers in California and Florida. The sites also distributed Java applets that connected to the mirrored systems to receive real-time data streams. The applets did the final processing, reformed the data and displayed it to users.

Standard data-delivery protocols are only part of the package. The team has already demonstrated spacecraft clock synchronization, and in June, it successfully tested standard File Transfer Protocol, Simple Mail Transfer Protocol e-mail tests and more.

"After all," says Hogle, "the spacecraft may want to send a message."

Forster is a freelance writer in Boston.



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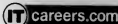
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Are you going to be ready for show-and-tell when everyone comes back to work after the holidays, bragging about the high-tech toys that Santa left under the tree? **Will your coolness quotient stand the test?** Or are you trying to find a gift for your favorite nerd? **Computerworld can help.**

We get to see a lot of new computer-related gadgets, gizmos and whatchamacallits during the course of the year, and we've picked out a few you might enjoy giving — or receiving.
**By Mathew Schwartz
 and Russell Kay**



MP3 Doubletake

PRODUCT: Duo MP3 Player
MANUFACTURER: Digisette LLC
WEB: www.digisette.com
PRICE: \$299.99

You could call this the first legacy-proof MP3 player to hit the market. This nifty little gadget actually plays in tape decks. Turn it on, pop it into any cassette deck and you'll hear MP3 songs. The unit ships with headphones, a rechargeable battery and charger and a parallel port adapter, along with 32MB of built-in memory (about 30 minutes of CD-quality audio), expandable via multimedia cards to 36MB.

There are some downsides: There's no LCD display to show which track you're on or what the play mode is. And you can't use the cassette deck's controls to fast-forward or rewind; you have to hit two buttons on the Duo itself.

The Duo interfaces with a PC via the serial port, which means you have to unplug any parallel port ZIP drives or scanners. (Digisette says the next version will offer a Universal Serial Bus computer interface.)

All in all, though, if you're looking to create an MP3 "mix tape," have a look at this. —M.S.

Remote Viewing — Not Just for Psychics Anymore

PRODUCT: DVD Anywhere and MP3 Anywhere
MANUFACTURER: XIO Ltd

WEB: www.xio.com

PRICE: \$89.99 and \$79.99

Consumer sob story: You don't know how many times I've had friends tell me they had DVD players in their computers, but they never watched DVD movies because the TV was in a different room. Or that they had a great new MP3 track that they could play only through their PC's so-so speakers, while lowering audio bellhennies were next door in the living room. (All that audio equipment just going to waste. The horror.)

The folks at XIO — better known for their remote-controlled, automated house devices and more recently for inexpensive, wireless digital cameras — have a couple of products that are great for getting audio and video around the house. DVD Anywhere transmits audio and video from PCs to TVs and audio equipment. MP3 Anywhere does just the audio part, for less money. The company claims a range of 100 feet for its products, regardless of walls, but my apartment isn't big enough to test that theory. —M.S.



See-Through Sound

PRODUCT: Sound Sticks
MANUFACTURER: Harman Multimedia
WEB: www.harman-multimedia.com

PRICE: \$199

Taking its design cues from Apple's transparent Cube computer, Harman Multimedia has created a new, three-way speaker system for your computer in clear Lucite. The speaker system features two vertical stereo units and a larger,

centralized subwoofer. The SoundSticks provide pretty decent sound, and since the system has a Universal Serial Bus (USB) port, you can use them with a PC or a Macintosh.

This speaker system is actually the big brother to the softball-sized spherical Lucite speakers that come with the Cube system, also made by Harman. The spherical units sound pretty good, but there's no question the SoundSticks are a definite improvement, as well as a visual delight. —R.K.

Listen to MP3 CDs on the Go

PRODUCT: Pine D'music MP3 CD Player SM-200C

MANUFACTURER: Pine Technology USA Inc.

WEB: www.pineusa.com

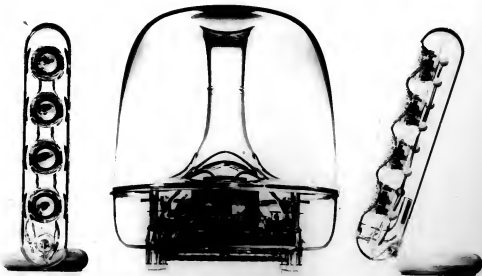
PRICE: \$199.95

With popularization of high-speed home connectors and Napster Inc., more and more people have been getting CD-RW drives to burn their



own CDs. But wouldn't you like to listen to the MP3s on those CDs when you're away from the computer?

Now, of course, you can. And one CD holds 10 hours of MP3 music. Pine's MP3 and CD player has nice, crisp audio quality, and it plays regular CDs to boot. The included rechargeable batteries last only about four hours, so use the a/c adapter when you can. It features an LCD screen that displays song titles to help you navigate. —M.S.



2000

2000



Digital Cameras

Digicam Delight

PRODUCT: Camedia 490
MANUFACTURER: Olympus America Inc.
WEB: www.olympus.com
PRICE: \$499

Ever since I was a professional photographer more than 30 years ago, Olympus has been known for producing physically small cameras with great lenses. For this era of digital photography, it has produced a standout model combining pretty high-quality 2.1-megapixel resolution and the ability to capture short video segments at a bargain price. It's not up to the Nikon Coolpix 990 (see review, page 83), but it's only half the price. —R.K.



Snap Direct to CD

PRODUCT: Mavica CD 1000
MANUFACTURER: Sony Electronics Inc.
WEB: www.sony.com
PRICE: \$1,399

Sony works its design and marketing magic once again with the Mavica CD 1000 digital camera. Early Sony cameras were noted for storing pictures directly on standard floppy disks. Today's higher-resolution pictures won't fit on a floppy, but Sony has extended the analogy: this camera records its photographs on 3-in., CD-R optical disks that cost only a few dollars each and hold 160 pictures. The resolution is "only" 2.1 megapixels, and it's a pretty big handful with its 10X zoom lens. —R.K.

An 'Entry Level' Pro-class Camera

PRODUCT: E-10
MANUFACTURER: Olympus America Inc.
WEB: www.olympus.com
PRICE: \$1,999

Olympus' new E-10 is a digital camera that will make any amateur who is serious about photography proud with envy. The resolution of this single-lens reflex is 4.1 megapixels (2,240 by 1,680). It comes with a fast 1/125th-sec. sharp zoom lens equivalent to a 35-140mm lens for a 35mm film camera. Just a few years ago, this combination would have cost more than \$25,000. Now, at just under \$2,000, it's relatively affordable for the serious amateur. —R.K.

Handhelds & Accessories

Plug That Memory Leak

PRODUCT: FlashPlug
MANUFACTURER: JKS Technology
WEB: www.flashplug.de
PRICE: \$99.95

A cute little device that plugs into the bottom of your Palm device, adding 6MB. While you can't run applications off of it, FlashPlug is handy when you're traveling and don't have a computer to synchronize your Palm with, or if you're carting around large databases of information, such as prescription databases (for doctors) or electronic books. It also works well if you're taking many pictures with Kodak's PalmTos digital camera. To save memory, you can transfer the images to the FlashPlug. While it would be nice if it used removable media, it's a quick and dirty solution for adding lots more memory to your Palm. —M.S.



The Cradle Won't Fall

PRODUCT: Happy Hacking Cradle
MANUFACTURER: PPU Ltd.
WEB: www.ppu.co.uk
PRICE: \$49

If your Windows PC crashes as often as mine, it helps to have backups handy. Not just software backups, but hardware ones, too. The coarsely named Happy Hacking Cradle (HHC) lets you plug a Palm III, IV or Vx series computer into a regular PS/2 computer keyboard. You've probably got an extra just lying around somewhere already. Two batteries power the HHC and last about six months, as long as you remember to turn the cradle off. —M.S.

Color Springs to Hand

PRODUCT: Visor Prism
MANUFACTURER: Handspring Inc.
WEB: www.handspring.com
PRICE: \$449

If you own a Visor and want to upgrade to color, the Visor Prism is for you. It works with any Visor accessories—keyboards, or Springboard modules such as MP3 players or cameras—that you already have. It also synchronizes with PCs or Macintoshes via the USB port right out of the box. The Prism has 6MB of memory and a 160- by 160-pixel display. It's also fast, owing to its 33-MHz Motorola Dragonball V2 chip. —M.S.



Stellar Photos

PRODUCT: Nikon Coolpix 990
MANUFACTURER: Nikon Inc.
WEB: www.nikon.com
PRICE: \$599

The Coolpix 990 is packed with so many features that in order to get your money's worth, you should know some photography basics. The camera has the equivalent of a 35- to 115mm zoom lens on a 35mm camera, and captures 3.34-megapixel images with a resolution of 2,048 by 1,536 pixels, which means you get really eye-popping images up to 8 by 10 inches.

The lens half of the camera rotates almost 360 degrees, so you can use the LCD to set up an array of off-center angles, including self-portraits that you can preview in real time. It also macrofocuses down to about 0.8 in. and can capture as much as 40 seconds of full-resolution video on the included RAM CompactFlash card. Image quality is absolutely fantastic. This is an all-around great camera. —M.S.

Cheap Stills, Cheap Video

PRODUCT: PinCam Trio
MANUFACTURER: AppleLink Inc.
WEB: www.applink.com
PRICE: \$79.99

Here's one for the kids: an inexpensive device capable of capturing up to 32 seconds of video, or 80 352- by 288-pixel snapshots. The device couldn't be simpler: LCD panel, two buttons and two AAA batteries. It's also less than 5 inches tall. Just a warning: when the batteries go, so do your images, so keep an eye on them. The device connects to a computer via USB port. —M.S.

Robots



Doggone It!

PRODUCT: Aibo
MANUFACTURER: Sony Electronics Inc.
WEB: www.sony.com
PRICE: \$1,499

Introduced a year ago but superexpensive and virtually unobtainable, Sony's Aibo is an "entertainment robot" dog designed to be a pet; it learns and grows through human interaction, has its own emotions, instincts — and extra code software, of course.

If you're allergic to dogs but have to have one, Aibo may well be your answer. He comes in black, silver or gold. And this year, the price has been cut nearly in half. —R.K.

R2D2, I Presume?

PRODUCT: PeopleBot
MANUFACTURER: ActiMedia Robotics LLC
WEB: www.activrobots.com
PRICE: Starts at \$30,000

This may not yet be the mechanical housekeeper that we've been dreaming of, but it could be a start in that direction. The PeopleBot is a robotic servant that comes in four models. It can move around a room or a house and navigate successfully around obstacles and over doorsills automatically. It has a tabletop height gripper with which it can bring you a drink and a networked video camera for surveillance work. Be the first on your block to get one! —R.K.



Software

LifeJournal Software

PRODUCT: LifeJournal
MANUFACTURER: Chronicles Software Co.
WEB: www.lifejournal.com
PRICE: \$39.95

If you've ever wanted to keep a journal, get this program. LifeJournal is a word processing program with cool features: Passages can be "highlighted" by topic for easier search and retrieval later. The program allows image files to be imported into journal entries. My only complaint is that it saves the images into the main file, which makes loading lots of images slow.

Entries can be sorted by date, title, keywords or topics, and they can be intelligently exported for printing. A vast array of challenges and prompts — such as famous quotations and recommendations for altering viewpoints — for blowing away writer's block is just a click away. —M.S.

Where in the World?

PRODUCT: National Geographic Maps
MANUFACTURER: National Geographic Society
WEB: www.nationalgeographic.com
PRICE: \$49.95

I've been a map snafu all my life. I love to pore over them, learning about distant lands and historical eras, studying the changes in political and physical features, fantasizing about going to exotic places. And I love to collect them as beautiful objects in their own right.

The gold standard has always been the National Geographic Society, whose maps are distributed free with its magazine. Now, you can get scanned versions of every foldout map the society has ever published on a set of CD-ROMs priced at far less than any comparable atlas in print. —R.K.



2000

A Lightweight Laptop Heavyweight

PRODUCT: ThinkPad X20
MANUFACTURER: IBM
WEB: www.ibm.com

PRICE: \$2,899

This laptop is a dandy traveling companion. In some ways, it reminds me of those clown cars at the circus from which the clowns keep pouring out toy on the outside, but humongous on the inside. Similarly, the X20 weighs just 3.5 lb., but its 600-MHz Pentium III CPU, 128MB of RAM, and 20GB hard drive are up to just about any computing task you might want to move around

The near-full-size keyboard is among the best I've found on any laptop, and the 12-in. 1,024-by-768-pixel display is bright and beautiful.

The CD-ROM and floppy drives reside in an add-on base that clips firmly to the ThinkPad but is instantly removable. There's a built-in light to illuminate the keyboard in really dark situations. When others tell you their laptops have magnesium cases, you can one-up them by noting that your X20 has a titanium-composite lid.

There's a built-in 56K/bd modem and Ethernet, a CardBus slot and a compact flash slot, too, making photo transfers from your digital camera a snap. —R.K.

Computers & Accessories

Clawing Your Way Up

PRODUCT: The Claw
MANUFACTURER: Fenners Design
WEB: www.claw.com.au
PRICE: About \$50 (\$69 Australian)

After a grueling, eight-hour Unreal tournament (last year's video game hit) in which I defended myself against evil government soldiers and eyeball-sucking Netherworld monsters gone awry, my hand wasn't crumpled into the dysfunctional mess it otherwise would have been. How's that? Say hello to the Claw, the first gaming device I know of made by Australians.

The Claw is an ingenious device that replaces the keyboard in first-person shooters. The device itself plugs in between your keyboard and PC, emitting regular keyboard signals when used, so the PC is none the wiser. But for games, it's better than trying to wrap your hand around unspaced keyboard keys. You rest your left hand on the device (only left-hand Claws are currently available) and go. Move keys are grouped around parts of the hand that have greater muscle control: the thumb and forefinger. —M.S.

The Stealth CD-ROM Drive

PRODUCT: 24X CD-ROM Drive Portable
MANUFACTURER: Teac Corp.
WEB: www.teac.com
PRICE: \$179

Of all the "portable" CD-ROM drives on the market that I've seen, Teac's little unit is the smallest and most convenient, and it's reasonably priced. Hardly bigger than a CD jewel case, it plugs into your laptop's PC Card slot and needs no external power. —R.K.

Quick Flash Card Reading

PRODUCT: Compact flash PC card adapter
MANUFACTURER: Various, including Protec Electronics Corp. and SanDisk Corp.
WEB: www.protec.com; www.sandisk.com
PRICE: \$9 to \$13

Though I love USB devices that read more than one format, my Nikon digital camera uses Compact Flash. The Compact Adapter lets you slide the card into the PC Card slot of your laptop or PC (only some have slots). It's dirt cheap, and it does the job extremely well. —M.S.

The Mouse That Roars

PRODUCT: Feel Mouse
MANUFACTURER: Logitech International SA
WEB: www.logitech.com
PRICE: \$39.99

The Feel mouse feels weird at first. As you move it, it vibrates and makes noises as if you're moving over textured surfaces instead of a desktop or mouse pad. You can tune the mouse's response to various kinds of on-screen objects, menus, hyperlinks, icons and more, and you'll know without looking that you've moved the cursor onto that object.

The accompanying software lets you emulate a variety of surfaces, from rubber to metal to spongy. And you can play with numerous parameters to create your own sensations. —R.K.

It's a Computer/Camera/Camcorder

PRODUCT: Vioo C1 Picturebook
MANUFACTURER: Sony Electronics Inc.
WEB: www.sony.com
PRICE: starts at \$2,299

In its latest incarnation, Sony's Picturebook—the small, ultrathin device with a wide-format screen—sports the new Chateau low-power microprocessor from Transmeta Corp. This machine works best for those with small hands and narrow fingers, but it's a remarkable package nonetheless.

It comes with 128MB of RAM, a 1256-bd hard drive, an integrated modem and a built-in digital camera. —R.K.

Storage Virtualization

DEFINITION

Storage virtualization is the presentation of a single, virtual data-storage interface to users. A middle layer of software — and sometimes hardware — translates between the users' views of the data-storage devices and how the data storage is really configured.

BY JAN MATLIS

THERE IS NEVER enough data storage. Accessing it can be complicated, using it fully is almost impossible, and making backups can be tricky. Those are just some of the problems associated with data storage, and they have increased considerably as the amount of data to be stored has ballooned.

First, there was the blurring of the distinction between networked and local resources. With an appropriate layer of hardware and software support, it was possible to make

networked resources appear local, so that disks spread around the network could be accessed as if they resided on the local computer. That made it possible to more fully use the capacity of data storage spread over a LAN or a WAN.

But making networked resources appear local didn't necessarily make it easy to use network data-storage capacity: There were still different protocols for accessing different storage devices. And there was the difficulty of keeping track of the odd megabyte here and there. With the movement toward storage virtualization,

such problems may go away.

Storage virtualization is an effort to abstract the function of data storage from the procedures and physical process by which the data is actually stored. A user no longer needs to know how storage devices are configured, where they are or what their capacity is.

For example, it could appear to a user that there is an ITB disk attached to his computer where data is being stored. In fact, that disk could be elsewhere on the network, could be composed of multiple distributed disks or could even be part of a complicated system including cache, magnetic and optical disks and tapes. It doesn't matter how data is actually being stored. As far as the user sees, there is just a simple, if very large, disk.

No Standards Yet

Storage virtualization can be implemented with different schemes or standards. At present, the market hasn't settled on any preferred standard, which means that what's under the hood — or what's in that layer of software and possibly hardware — depends on which vendor you've chosen.

Though there's a drive toward standardization, it's a ways off. Right now, many vendors are focusing on individual problems and designing and building according to their ideas of a virtual storage system. One consideration for most vendors is that storage

virtualization aims to provide the most complete use of storage resources without sacrificing performance. Other important vendor concerns are ease of use and maintenance.

Some of the storage virtualization systems being fielded are disk-oriented, presenting a disklike interface to users and configuring the actual storage out of multiple networked disks. A term that comes up frequently in discussions of disk-oriented systems is the storage pool.

From a user's perspective, the storage pool is a reservoir from which he may request any amount of disk space, up to some specified maximum. The goal of the intervening software and hardware layers is to manage the disjointed disk space so it looks and behaves like a single attached disk.

The disk-oriented paradigm offers a number of benefits beyond simplicity for users. When the interface to a series of heterogeneous networked disks is unified, it becomes possible for a systems administrator to impose a single policy that covers all the data storage. It's also easier to implement a single, comprehensive backup scheme. The virtual interface helps ensure that the full capacity of the data-storage devices spread around the network is used. And the system is scalable: Adding more disks is invisible to users.

Some examples of disk-oriented systems are Fort Lauderdale, Fla.-based DataCore Software Corp.'s SANsymphony, which sits on a storage-area network (SAN) server; Compaq Computer Corp.'s Storage Works Virtual Replicator on Windows NT and Windows 2000; and Compaq's proposed VersaStore Technology for SANs. But other possible approaches can be useful. Some virtual storage schemes are much more tape-oriented —

Ask Yourself . . . And Your Vendor

If you're a systems administrator contemplating a switch to storage virtualization, be sure to ask yourself — and your vendor — these three questions:

1. What kind of network does the virtual storage manager need to sit on?
2. Can the system make use of older storage devices?
3. Will the virtual storage system be able to interoperate with new devices that come on the market?

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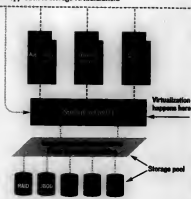
One example is Louisville, Colo.-based Storage Technology Corp.'s Virtual Storage Manager. To a host, it looks as if data is being written to a physical tape device, even though there's actually an intermediate disk buffer that handles the data before it's written onto a backup tape cartridge. This technique of staging data makes for speedy and efficient backup.

Some proposed storage-virtualization frameworks are designed to let different virtual-storage-management systems interoperate and also to standardize how various storage elements (such as disks, tapes and cache) are handled. The idea is to take best advantage of inexpensive, slower media while still providing users with quick access to needed data. Among these systems are Hewlett-Packard Co.'s Virtual Storage Architecture Guide and Sun Microsystems Inc.'s Jini.

Matlis is a freelance writer in Newton, Mass.

Disk-Dominated Design

One approach to storage virtualization:



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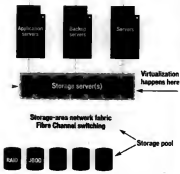
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Desktop Management Systems Go Mobile

Mobile Automation's software manages wireless devices over the Web

BY DAVID EGGEN

FOR JAY MARKANICH, senior network engineer at IT consultancy Clarkson Group Inc. in Durham, N.C., system management is inescapably a remote-control process. Some 250 of his company's 300 systems are notebook computers. But when Markanich needed to distribute Y2K patches last year, he discovered that the best-known system-management tools wouldn't be much help. "We thought that Microsoft SMS [Systems Management Server] might be able to solve our needs," Markanich recalls. "But we actually tried SMS and found that it did not handle remote users very well."

Markanich eventually found Mobile Automation software from Mobile Automation Inc. in Los Angeles. It uses remote-agent software that, at 2MB, is smaller than SMS's, he says. It also optimizes communication with portable computers that connect sporadically, often over low-bandwidth networks.

Markanich uses it to track software licenses and to download an expense database and security-related updates to consultants' notebooks. "It makes it possible for us to download large pieces of information to users without their ever knowing it," he says.

Ahead of the Curve

Mobile Automation was largely the brainchild of company president Douglas Neal, says Chairman Rod Turner. The two saw firsthand the need for mobile support while at Symantec Corp. in Cupertino, Calif. "We were noticing through our customer base a strong desire to address the mobile workforce," Neal says.

Their first product, RightState, debuted in 1998 and flopped. Neal and Turner blame the failure on entering the market too early, and using

e-mail as the transport mechanism. "Laptops weren't as pressing an issue as we thought they were," says Turner. "Companies were reluctant to use e-mail because they knew the limitations of those systems."

They changed the product's name to Mobile Automation

and made HTTP, the Web protocol, the transport. That conversion brought new customers and enabled Mobile Automation to sell to what Neal says is a growing new industry: managed service providers, which provide remote management services.

The current product, Mobile Automation 2000, extends the inventory and software-distribution functions from desktops to notebooks and handhelds. It supports Palm and Windows



DOUGLAS NEAL, CEO and co-founder, says his company received initial backing from disk utility guru Peter Norton.

Mobile Automation Inc.

Location: 1111 Santa Monica Blvd., Suite 1220, Los Angeles, Calif. 90025

Telephone: (310) 914-9633

Web: www.mobileautomation.com

Niche: System management and synchronization software for mobile computers

Why it's worth watching: Growing fleets of mobile devices need to be tied into existing system-management infrastructures.

Company officers:

- Douglas Neal, CEO and co-founder
- Rod Turner, chairman and co-founder
- Jack Horner, vice president of engineering

Milestones:

- April 1997: Company founded
- September 1999: Mobile Automation 2000 launched

Employees: 15, expected to double within six months

Burn money: \$5 million from Greylock and software guru Peter Norton; an \$8 million second round is planned

Products/pricing: Mobile Automation 2000 Small Business and Enterprise: \$5,000 per server plus a per-node charge of about \$50 (varies with volume)

Customers: Advanced Micro Devices Inc., Dunkin' Donuts Inc., Ford Motor Co.

Partners: Everdream Corp., Strategic Systems Information Systems Inc.

Red flags for IT:

- Mobile Automation could face stiff competition from larger management tool vendors.
- The company doesn't offer wireless connectivity support yet.

CE devices, but they must be docked to PCs to receive updates, unlike Affix from competitor XcelleNet Inc. in Alpharetta, Ga. Neal says his company will add wireless features within six months.

Though Mobile Automation 2000 integrates with SMS, Neal claims success in persuading customers to replace SMS on desktops.

Brian McEvoy, director of business desktops at UniGraphics Solutions Inc., a St. Louis-based computer-aided design development firm, is one such customer. McEvoy uses Mobile Automation for software distribution and license tracking on 3,000 systems worldwide, only a third of which are portable. "We realized we didn't need any of the features of SMS," McEvoy says. "SMS was causing us some problems in the build environment for developers."

Adding Remote Control

Mobile Automation plans to add a remote-control feature — commonplace on desktop-based tools — by year's end. Customer-requested changes are likely. "It's not real strong with hardware asset management," Markanich says. "It basically reports software."

Markanich and McEvoy both say they've asked Mobile Automation to improve the database-reporting capabilities. "You can get a lot of information from it, but it's not always easy to format," Markanich says.

The rewrite-to-Web open standard was key to Mobile Automation's competitiveness, says Jack Horner, the company's vice president of engineering. It makes the software easier to deploy and use, and will make it more readily deployable on handhelds, which aren't well standardized. "Our product sort of fits its way around the way your company works," Horner says.

Mobile Automation isn't profitable yet, but it appears to be on the upswing, with an \$8 million round of financing in the offing. The vendor may also be making inroads with large companies: It recently signed Ford Motor Co. in Dearborn, Mich., as a customer. ■

Essex is a freelance writer in Antirrh, N.H.

the buzz STATE OF THE MARKET

Three's Company

Mobile Automation is in a three-way dogfight with Callisto Software and XcelleNet, which also sell management suites for mobile devices.

The trio also compete indirectly with distribution and software-distribution vendors such as Marviva Inc. in Mountain View, Calif.; Novadigm Inc. in Mahwah, N.J.; and Synchrolog Inc. in Alpharetta, Ga. At 3 years old, Mobile Automation is the newest player.

Analysts and customers say Mobile Automation is an eager-to-please, growing company with good product and poor marketing, which fosters an impression that it lacks staying power. "Quite honestly, I don't see much of Mobile Automation," says Ramesh Colville, director of research at Gartner Group Inc. in Stamford, Conn. "My take is cautious right now."

Colville also faults the company for thinking it can get corporations to dump desktop-management stalwart Systems Management Server (SMS) from Microsoft Corp. "I think it's a bad strategy," she says. "XcelleNet tried to do that." The mobile management industry is so small that a barely shown up in Gartner's market-share numbers, but demand is skyrocketing, according to Colville. That's one reason the three will face growing threats from software distribution vendors. And before long, desktop suite vendors will turn their sights on the mobile too, she predicts.

Callisto Software Inc.

Whetstone, Ill.
www.callisto.com

Claiming tighter SMS integration and a broader, deeper feature set, Callisto has had success selling its Orbiter software to corporate help desks.

Orbiter's main disadvantage is lack of handheld support. Backy Hejlskov, co-founder and vice president of product development says all three companies could do a better job of scaling their software across large enterprises.

XcelleNet Inc.

Alpharetta, Ga.
www.xcelle.net

Wireless support for the newest handheld devices may be XcelleNet's biggest advantage.

XcelleNet also appears financially stronger than its competitors, with revenue last year of \$62 million and \$16 million in profits.

—David Essex



RANDY MARTIN
MANAGER AT
CVS.COM
PHOTO BY JEFFREY M. HARRIS

Skill Set Soul Searching

When assessing your skills, look inward and outward. By Mary Brandel

STEVEN KIGHT was well regarded as a network operations manager. His employees, peers and managers all said they liked the quality of the work he was doing.

But something wasn't right. Kight didn't truly enjoy his job, and when he looked at what the market valued, his skills weren't leading the pack. So he took a good look inward and decided that what he would really like to pursue was project management.

That self-assessment was the first step toward a whole new phase of Kight's career. He's now manager of e-business at Worldwide Information Technologies Inc., a professional services company in Dallas.

Taking an honest look at your skills — from a business, technical and communications perspective — is more important than ever today. It can help you avoid getting caught in a dead-end job or letting your skills get outpaced by

the fast-moving technology and business worlds.

"It falls into three parts: What are the skill sets I'm good at, what do I like doing, and what does the market value? Then you try to put all three of those things together," says Kight, who says he does this type of self-assessment once each year.

The first step of any skills-inventory exercise is to take an honest look at yourself. Kight determined that he needed more project management experience before pursuing it as a career. He worked as a contractor for a year, at the end of which he did another self-assessment.

This time, Kight determined that his weakest area of project management — pure development rather than infrastructure and process work — was the most interesting to him. He says he also wanted to get into Internet and e-commerce work. That's what led him to accept a position at Worldwide, where he has become immersed in e-commerce.

Self-Assessment Strategy

When assessing your strengths and weaknesses, it's important to look at four skill areas: technical, process, managerial leadership, and industry and business knowledge, says Bond Wetherbe, principal consultant at Kingwood, Texas-based consultancy The Concours Group Inc.

In the technical and process areas, ask yourself how well you design systems that improve business processes, resolve problems and reduce costs. On the managerial side, how well do you communicate, analyze, negotiate and lead projects?

As for your industry and business knowledge, how well do you interact with the business unit leaders — can you listen, learn, relate and contribute to their business outcomes? It's a good idea to check with your peers and your manager to keep yourself honest when pursuing the answers to these questions.

It's also helpful to establish whether you want to be more technology-oriented or business-oriented. "If you want to remain technically oriented, you need to think in terms of the [chief technology officer's] role or working for a systems integrator or consultancy," Wetherbe says. Conversely, if you want to succeed in a particular business or industry like oil and gas or pharmaceuticals, "you definitely need to focus on your managerial/leadership skills [and] business/industry knowledge," he says.

Randy Martin, program manager at CVS.com in Seattle, agrees. "At some point, you have to figure out whether you're going to be a technology generalist with a business orientation or a technology specialist," he says.

"There have been two or three points over the past 10 years that skills assessment has really come into play," Martin says. The first was when IBM's

DB2 arrived; the next was when he wanted to work on a PeopleSoft project, he says. The most recent was the arrival of the Web.

In each case, Martin recognized his skill shortcomings, engaged in self-education through course work and reading, and then took a job where he could contribute while still learning the required new skill. When interviewing for the CVS.com job, "at least I had some Web background so that I could talk about it coherently."

You can also look at your own company. "If your organization is going to be implementing an SAP system, it might be useful to get training in SAP systems and concepts, how those applications would work in your company, and you might want to learn about programming languages such as [Advanced Business Application Programming] XML and C++," Wetherbe says.

But perhaps the most important aspect of personal skills assessments is getting feedback from others in the company.

Wetherbe tells of a large IT department that rated itself in a number of skill areas and asked its internal customers to rate the department as well. Ratings were on a scale from 1 to 5, with 1 being nonproficient and 5 being extremely proficient. When it came to technical skills, the IT staff rated itself a 2. Customers, however, gave it a 4. Meanwhile, in the managerial leadership area, the staff rated itself 3.2, while customers rated the department a 1.

"The good news is, as you progress in your career and get better at honestly assessing your skills, you're better able to judge what you enjoy vs. what you're good at," Kight says. ■

Brandel is a freelance writer in Newton, Mass.

Skills Self-Evaluation Questions to Ask

What do you attract with your own skills assessment? Here's a series of questions to ask yourself, says Bond Wetherbe, principal consultant at The Concours Group.

- What do I want to do in business?
- What companies offer that opportunity, including my own?
- How well do I fit in my company now?
- What do I have to do to create a better fit?
- How can my performance affect the business outcomes that my organization is trying to achieve?
- What resources do I have available to develop myself?

— Mary Brandel

Software Engineer, Research & Development • design computer projects, systems & applications, design sort programs & computer systems, write & implement software programs, install & test software, analyze & compare sys. needs & capabilities, modify software programs to ensure tech. accuracy, provide tech. solutions for bus. systems, economic, scientific & financial problems, develop & test software, implement through app. specific, develop descriptions, architecture diagrams, product descriptions & cost estimations, use Oracle & Microsoft, Sun, Sparc Solutions & C++, Java, C, Fortran, Pascal, SQL, Perl, PL/SQL, Quattro MS-DOS, IBM, etc. employment on 24 hrs. basis, 40 hrs/wk. Sun Spc. \$73,600/yr. Send two copies of resume/letters of appl. to Job Opportunities, 10000 E. 15th Ave., Greenwood, NH 03020-9916.

Software Engineer (multiple openings): Design, develop and implement computer software systems using PeopleSoft and related software. Work requires extensive travel and frequent relocation. Must have 1 year in the job offered or as a computer professional and 1 year of experience using PeopleSoft and related software. Bachelors degree in Computer Science, Applications, Engineering, Math, Physics, Chemistry or business related field. Salary: a \$85,000.00 per year, 40 hours, 9-5. Send resumes to Mr. Terry N. Faudt, Manager, Washington County State PW Conversion, 9000 Center Road, ISOLL, 9000 Center Road, Island, Washington, WA 98148-4817. Job Description: WFLA-TV 10

Software Engineer Analyst
Design, develop, implement and test software applications and technical user support systems and related user interface development tools on multiple platforms and environments. Demonstrated ability designing and developing software applications using C++, SGA, Borland, Visual C++ or .NET.
Demonstrated ability designing and developing software applications using Java, Sysview TCP/IP protocols. Demonstrated experience in developing software applications on multiple platforms such as Windows NT, Solaris, Windows 95.
\$76,250-84,400 Ann. Inc. 5 p.m.
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SOFTWARE ENGINEER design, develop, debug, test and maintain software and systems applications using Object Oriented Methodology: C/C++, C++, COBOL, Pascal, Basic, Oracle, SQL, PL/SQL, Perl, Fort, Perl CGI and HTML, under Windows 95/NT and UNIX operating systems. Requires M.S. degree (or equivalent in Computer Science or engineering discipline) as a clearly needed factor in three years of progressively responsible experience in the job offered. A B.S. degree with five years of progressively responsible experience will be accepted in lieu of the M.S. degree and three years of experience. Salary \$80,000/year. M-F 9:00 am

Software Engineer (Multiple Openings) Design, develop and implement software systems to determine feasibility of design and direct software testing procedures, programming and documentation. Must involve extensive travel and frequent relocations. Must have one year of experience with one of Group A and 1 of Group B, or 1 of Group C, OR 1 of A and 2 of B, OR 1 of A and 2 of C as follows:
Group A - Windows 3.1, Windows NT, Windows 95, Windows ME, Unix HP, OS, IRIX, Bor C/C++ Visual Basic, PowerBuilder Group C - Java, TCP/IP, HTML, MFC, CGI, PERL, ASP/COM/COM Active X, MTS. Bachelor's degree in

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Software Engineer in research design and develop computer software for the development of hardware product development. Developing and direct software system testing procedures, programming and documenting software development. Must be well versed in all phases of software development life cycle, able to design and develop commercial applications using languages such as C++, C, Visual Basic, and Java. Must be a team player. Should be thoroughly sound with hands on experience in building Client Server applications and distributed applications using C++, Oracle on Windows NT and Unix platforms. **Requirement:** A Bachelor's degree in computer Science engineering or closely related field and five years of experience. Good resume to: ACSI International Resources Inc. Suite 100, 5 Innovation Way.

Software Engineer

Produce software using C++ and Developer 2000. Test software and subprograms, implement, document, and deliver software. Install, document, and train users on the software. Maintain system and upgrade software as required. Also responsible for managing client discussions and connecting system to their existing data in access network. Other tasks include: export Windows 95/98/2000 Master of Office, Windows 4.0 NT, access

Systems Software Engineer
 (remote, springing) Design, develop and test systems and software systems in derivative feasibility of design and direct software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have one year of experience using 1 of Group A and 1 of Group B, or 2 of Group C.

PROGRAMMER/ANALYST—Design, develop, test, and maintain computer programs and systems. Responsibilities include: analyzing user requirements, designing program logic, writing code, testing programs, and documenting systems. Requires a degree in computer science or a related field, and experience with programming languages such as Java, C++, or Python.

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Sensor Software Engineer (multiple openings) Design, develop and implement software for sensor systems. Apply use of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent contact with customers and users. Requires a minimum of 3 years of experience using S&P. Masters degree in Computer Science/Applications, Engineering, Chemistry, Math, or Physics. We accept Bachelor's degree or foreign equivalent, with the years of progressive experience as computer programmer or software engineer. 40 hrs/week. \$90,000-\$110,000. P/E 15219

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reference Job #COROL & WE-
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Computer Engineer for computer service and development company located in Ft. Lauderdale. 40-hour week. \$3 AM - 8 PM. \$18,000 per year. Will plan, develop, test and document computer programs using knowledge of programming. Analyze performance of computers, server the performance and after the program and/or computer is found to correct any errors. Develop, test, install, maintain, repair, and service computer systems, insert units to solve existing problems. B.S. or equivalent equivalent and 2 years experience a job offered. Supervised 2 employees. Submit resume to: Bureau of Worldwide Programs Support/V.A.C. Unit, P.O. Box 38889, Tallahassee, FL 32306-0889. Fax: 904-224-0000.

Software Engineer to develop MS windows based information systems, database with application programming. Responsibilities include analyzing, developing and testing, and maintaining of information databases design and implementation, with application development. Applicants with Master's degree in CS (at least 18 months related experience). Required skills: C++, Visuals, Database APIs, C, Win32, STL, Windows Scripting, Java, JSP ASP, XML, SQL, Active X, COM, MSGOOL. Full time position located in Ft. Lauderdale, Florida. If you feel your qualifications are a fit to President Chumak Technion Communications Corporation, 6021 NW 40th Avenue,

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IT Careers in Software Engineering

While e-business, e-commerce and web enablement have been the headline items for information technology over the past year, the fact remains that at the base of all the IT activity is software. Someone, somewhere is engineering the language and code that enable business.

It's this core competency - software engineering - where the stakes are highest for employees. Companies work overtime to attract and keep software engineers who support businesses as far flung as mailing systems and communications, aerospace and financial services. Salaries have skyrocketed, and signing bonuses have gained an all-new meaning. However, the savvy companies know that it isn't a gimmick that gets and keeps the highly qualified software engineer. It's the nature of the work.

BindView Corporation Houston, TX

BindView, founded 10 years ago, is a leading provider of software solutions that enhance business performance by ensuring the integrity and reliability of the IT infrastructure. BindView's comprehensive software offerings secure and simplify the management and administration of network operating systems, directories, and related applications. In addition to software, the company provides customer support teams. The company has development sites in Houston, Boston, Fremont (CA) and Arlington (VA).

The company claims four keys to its success. "The first is education," explains Ann Cooksey, director of recruitment. "We offer a combination of in-house and third-party training and attendance at conferences, symposia and exhibitions. We expect our developers to seek training and support them in doing so." The second key is introspection. "We expect developers to always be looking for better ways of accomplishing old tasks," adds Cooksey. "We offer a culture of excellence, screening applications both on attitude and skills. We look for people who will continue to grow and who are not satisfied with good enough. Finally, we believe communication is key. We evaluate processes and correlative seek to improve them."

The company is seeking to fill positions that include all levels of software development engineers; deployment engineers; configuration manager/version control engineers; user interface designers/graphic artists; software system test engineers; software quality assurance engineers; information developers and build-system engineers. "We look at resumes for where you've worked and when, the tools and software you've used, education and a description of your work experiences," says Cooksey.

"We put a lot of effort in recruiting top talent and then keeping them," she says. "We offer the latest equipment in a comfortable and casual work environment, have a commitment to research and development and act on employees' ideas and suggestions. BindView is a dynamic, fast-paced and comfortable company. We translate future business challenges into technology and tools. The top selling point for BindView is the people. We tend to have the top of the best, attracting people who want to be in a learning environment and who want to be

part of a group that is figuring out things that have never been done before."

Lawson Software St. Paul, MN

In the lore of software companies, Lawson Software is the elder statesman. Founded 25 years ago, the company continues to develop and provide software applications and upgrades to the healthcare, retail, professional services, telecommunications, public sector and financial services sectors.

"In the past month we've released our latest version of Lawson Insight, offering new modules and functionality enhancements for our targeted markets," explains Terry Boevers, company spokesman. "We also are partnering with application service providers and partners who can add value to our solutions for additional markets. In this way we can quickly add new Lawson users and get into new markets we couldn't approach before, something we call our Lawson dot-community strategy." Lawson also is delivering 360-degree e-business solutions. "We want to automate business process from beginning to end," adds Boevers. "For instance, in procurement we want to provide customers with a solution that works from req (requestion) to check (payment)."

Paul Laidlaw, associate human resources manager of employment and recruitment, says that while ongoing research and development is critical, so too is the challenge of finding qualified individuals. With approximately 1,900 employees, the company plans to hire an additional 120 people for the research and development center, as well as regional offices in Vienna, VA; Little Falls, NJ; Boston; Atlanta; Irvine and San Francisco, CA. An e-recruiting tool at the Lawson Internet site assists potential candidates in matching up skills and criteria with current Lawson open positions. "About half the jobs are revenue generating and the other half are in research and development," says Laidlaw. "We need experience with JAVA, web development, object-oriented design, COBOL, and then various platforms, UNIX and NT, AS400."

Laidlaw looks on resumes for proof of accomplishment and career progression. "You'll work both as a single contributor

IT Careers in Software Engineering

and as a part of a team," explains Laidlaw. "Typically you will work on applications, developing new ideas for the product line.

"There are several reasons to choose Lawton," he adds. "We have turnover well below the industry average. You'll be able to take your ideas into the real world. We're probably the largest software player out there that is still privately held. And our 3,000 customers include the first client we ever sold software to."

Pitney Bowes Technology Center Shelton, CT

While Pitney Bowes manufactures and sells a number of business and consumer-based products, its Technology Center in Shelton is focused on engineering. Products developed here are sold as stand-alone applications and as web-based applications. The technology campus supports a number of businesses, including the mailing systems group, which offers postage and secure messaging, as well as shipping applications.

"We're working to provide customers with a variety of access points," explains Nanette Brown, director of software engineering for the mailing systems business. "Currently we're working on a suite of products that ranges from click messaging to click stamping and click shipping. In the future we'll see Internet connectivity for our traditional products, such as metering and mailing machines."

The Technology Center currently employs approximately 1,000 individuals. Positions are available for developers, architects, systems engineers and test engineers. "One of our major challenges is finding software engineers who also have good design, analysis and leadership skills," says Brown. "This is not just coding. We need diagnostic skills that are imperative to high quality software."

Brown says most people who work at Pitney Bowes give the team and technical environment as primary reasons for staying. "What most people say they like best is the community of people here. We place a lot of emphasis on working together as a team, having people be part of developing processes. Here you can be a part of something, shaping a product."

To assure that employees remain interested and continue to develop, Pitney Bowes moves people between different assignments. "We offer a training program, which we fund well, to enable this," Brown adds. "We want to offer some of those things that might entice a talented engineer to go elsewhere. We encourage engineers to help blaze the trail and solve problems."

SmartPipes Corporate Headquarters - Redwood City, CA Network Intelligence Center - Dublin, OH

The ability to build a successful business that can react quickly to market changes is tied directly to a company's network. SmartPipes' goal is to offer companies the



ability to control their network and take advantage of added communications services, all at significantly lower costs than current network solutions. "Today, most companies use frame relay and lease lines for site-to-site networks. They can move to the Internet for a less expensive, more reliable and secure service," explains Ken Jones, vice president of engineering. "SmartPipes provides advanced IP services such as secure intranets and extranets and interactive communications services that business customers can manage, from anywhere on the Internet, through a web-based graphical user interface (GUI)."

Dave Carino, director of engineering, reiterates the point. "SmartPipes supplies an easy way to manage global IP services that normally would require 20 to 40 network engineers. We are solving a problem that has not been taken care of with software engineering - by building something entirely new."

Combining corporate networks with the public network will allow companies to extend still further, using application services and extranet business connections. "We are breaking new ground here, building a provisioning and monitoring system capable of monitoring and managing millions of edge devices," Jones says.

Currently, SmartPipes is building a tool kit for adding and supporting network devices, and will continue to grow by adding still more services. "We're creating a multi-tiered, DNA-based distributed web plant with a business logic tier already composed of more than three million lines of code," adds Mark Beadles, chief architect.

This is the kind of one-of-a-kind challenge that makes SmartPipes attractive as an employer. "A lot of development can come into a company and write code," adds Carino. "SmartPipes offers the opportunity to leverage your skills to solve a business problem, for the first time."

Unlike most startups, SmartPipes faces an excess of demand already. "We are a one-year-old company going after a multi-billion dollar marketplace that represents the next wave of Internet service users," Jones says. The business model involves a monthly fee from clients to secure a smooth cash flow.

"We're a team-oriented organization that allows people to apply their talents where they're best suited," adds Beadles.

XStream Logic, Inc. Los Gatos, CA

There's a hum in the IT industry concerning an all-new microprocessor that will enable more complex, high performance networks. At the creation and is XStream Logic, a rapidly growing, pre-IPO startup that is unlocking the potential of networking and storage equipment vendors to deliver intelligent packet processing and advanced networking services at very high data rates.

"We're building a network processor optimized to perform deep packet processing (networking layers 4-7) at data rates up to 10 Gbps. This allows our customers to deliver advanced services such as enhanced quality of service and billing applications that fundamentally change the nature of networking equipment," explains John Lynde, XStream Logic's director of software engineering. "Due to the programmable nature of our solution, we can be deployed across a wide range of equipment, such as core and edge routers, load balancing switches, storage devices and servers."

XStream Logic was incorporated in May 1998 and currently employs approximately 50 people. The company has plans to hire another 50-60 people within the next 12 months. "We need people in key areas of development tools, embedded operating systems, network software, and simulation/network testing," says Lynde. "We look at resumes for quality experience in these areas. Engineers with embedded software development experience, device driver and network stack implementation work, and engineers who are comfortable working with system kernel-level code are the ones we focus on."

"What attracts engineers to XStream Logic is our technology, our people, and our work environment. What we are doing in terms of hardware architecture is so leading edge that it has the entire industry excited," adds Lynde.

In particular, XStream Logic's advancements in networking and processor architectures unlock the ability of software engineers to create powerful solutions that can fundamentally change the capabilities of the networking infrastructure that defines the Internet," he says. "At XStream Logic, you can work on truly innovative and new technology. You get to work with world-renowned computer scientists, and the people here are great. We have created a productive, fun, and supportive work environment."

Lynde notes that XStream Logic offers individuals the opportunity to grow and stretch, too. "You can come on board with expertise in one area and grow into another," he says. "Embedded software and networking is the place to be. Whether you're working on applications, systems, or tools, there is always something new and exciting to learn and work on in this space."

IT careers

For more job opportunities with Software Engineering News, turn to the pages of *News*.

- If you'd like to take part in an upcoming *News* feature, contact Anna Crowley, 650.512.0667 or anna_crowley@news.com.
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FRANK HAYES/FRANKLY SPEAKING

Domain Mastery

SURE, .biz and .aero and .coop are big news. But let's talk about sex — specifically, sex.com. Last week, a federal judge in San Francisco ordered that domain name to be returned to its original owner, after hearing allegations that a new owner had forged documents in 1995 transferring the name to himself. Want to know how easy it was to steal a hot domain name? According to court documents, all it took was one forged document sent to the domain name registrar, Network Solutions Inc. And how tough was it to get the name back? It took five years of legal work.

OK, everybody — go ahead and make your jokes about the poor guy who went five years without sex.com. Finished? Good — because the case points up a real risk for corporate IT shops, especially with a flood of new top-level domains on its way.

In the months to come, you'll be acquiring lots of new domain names: yourcompany.biz, yourcompany.info, yourcompany.pro. You won't use most of them, but you'll have to lock them up because they're confusingly similar to yourcompany.com. And you'd better have a good system in place to keep track of them — and, more importantly, to make sure they remain yours.

This isn't a big-ticket item. Domain names are hugely valuable, but they cost only \$35 a year. What's expensive is if you don't know that one of your domain names has been hijacked. Or you forget to renew an important name. Or my chance to snap up a name your marketing department really wanted.

That's when the bill will arrive on IT's doorstep — whether you knew it was your responsibility or not.

So how do you make sure you have your domains nailed down?

Inventory. You need a complete, up-to-date list of your domain names and their status — whether they're your primary domains, the pointers that forward users to your Web sites or names that are just parked (that is, registered but not being used). And someone on your staff should — as a primary job responsibility — be maintaining that domain inventory. **Status checks.** You need to regularly verify that everything in that inventory is what it's supposed to be. That means checking every domain name to make sure it's still registered as yours

and confirming that contact information and the domain servers listed are correct. You can automate this process, but someone on your IT staff should make sure the script is being run and that it's being done right.

Shadow inventory. You also need a list of confusingly similar domain names that you don't control.

That may include product names as well as your company name. And you should check their status regularly, too, in case the registrations lapse. When one becomes available, you might want to jump on it fast to use or park.

Domain research. You need to be looking for domain names to track in your shadow inventory, too. That means checking regularly with Marketing and Legal about forthcoming product names and trademarks they might want to protect. Business changes — and so will the list of domains you need to follow.

Plan of action. Finally, you need to pave the road in case a problem or opportunity shows up. If you discover someone has hijacked one of your domain names, you need to know exactly who in Legal or management to tell, and what information they'll need to take action. You also need authority to buy up the domain names

you want without a lot of paperwork — domains that are here today are often gone tomorrow.

Maybe it all seems like too much work to track some \$35-a-year domain names. Just remember — sex.com turned out to be worth \$100 million a year. That's a lot of incentive to remain master of your domains. ■

Computerworld's senior news columnist, has covered IT for more than 20 years. His e-mail address is frank_hayes@computerworld.com.

SHARK TANK

OVER THE WEEKEND, IT staff at an engineering society installs a new file server. That takes storage up from 18GB to 54GB. "We now have breathing room," says a pilot fish. But on Tuesday, there's an error message warning that the server has less than 1% free space. Hard-drive fail-out? Software snafu? Nope. Seems several secretaries were tired of thumbing through the CDs with 2 million clip-art images, so — with extra disk space available — they copied the entire collection into their personal directories on the server.

new volume. Back comes the real story: "That server has three unused drives: 2GB, 4GB and 18GB. Which one should we create the volume on?"

ON FRIDAY, this pilot fish spends the day at a newspaper office, setting up a new high-end Macintosh network, scanners and digital cameras and giving users a crash course in the new stuff. Monday, he finds he didn't cover quite everything. "We dropped one of the computers and broke part of it off," user says. "Will it be OK?"

DOT MATRIX PRINTER supposedly "making off" brings help desk pilot fish on-site. He knows the printer doesn't take oil, and a snail reveals the yellow liquid is urine. The fish asks a secretary — who admits an opossum has been trapped in the building for the past week. Cursing the problem toilet, fish quickly types: "Possum pee in printer."

TO BOOST "quality of service," IT provider creates remote support center and hands over server rights to the new group. When a customer makes an emergency request for 10GB of disk space, local LAN admin pilot fish asks remote tech to create the

IT BOSS BRAGS of his programming skills to pilot fish. Find a bug in your assembler code, and I'll buy you a bottle of Pinch. Fish finds a bug that night (compiled data from sign-bit extension after right shift, for list of bit punks), and points it out. Boss is furious, but admits defeat — then retires. "You just can't trust bosses to cover their bases," gumbles the fish. "To this day, I don't know what Pinch is."

Shift your bit right to sharky@computerworld.com. You get a Shark alert if your true tale of IT news print — or if it shows up in the daily Web feed at computerworld.com/sharky.

The 5th Wave



"This is amazing. You can stop looking for Derek. According to an MGN search I did, he's hiding behind the dryer in the basement."



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